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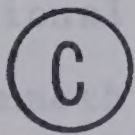
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THE PRIVATE MONETARY RETURNS TO VOCATIONAL EDUCATION
TEACHER TRAINING IN ALBERTA

BY



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A THESIS

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The main problem dealt with in this study was that of evaluating the monetary returns to investment in vocational education teacher training in Alberta. The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "The Private Monetary Returns to Vocational Education Teacher Training in Alberta" submitted through participation in the Vocational Education Program, by Kenneth Walter Anthony Wallace in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

Six sub-problems were subsumed under the main problem.

ABSTRACT

The main problem dealt with in this study was that of evaluating the monetary returns to investment in vocational education teacher training in Alberta. The private investment perspective, as distinct from the societal, was maintained throughout, and the vocational education teacher training was restricted to that available through participation in the Vocational Education Program, Route I, Faculty of Education, University of Alberta.

Six sub-problems were subsumed under the main problem. Each focused on a significant variable: occupational background, sex, age, years of training, alternative university programs, and successive investment decisions. The inquiry was limited to: (a) two male trades occupations, automotive mechanics and construction electricians; (b) two female trades occupations, senior stenographers and beauticians; (c) three age levels for each trades types; (d) two alternative university programs, academic teacher training and engineering training; and (e) three successive investment decisions.

The data used in the research were of two kinds: average costs data and average benefits data for the base year, 1968. The average costs were subdivided into three classes: direct costs, indirect costs, and negative costs. The direct costs included: tuition fees, registration fees,

student activities fees, and other academic costs. The average earnings foregone in the four selected trades constituted the indirect costs, while the financial assistance available in terms of bursaries, subsistence allowances, and payment of tuition fees, constituted the negative costs.

The benefits data were obtained from three sources: an average salary scale for vocational education teachers, an average salary scale for academic teachers, and an average salary scale for professional engineers.

Three methods of investment evaluation were used: additional lifetime earnings (marginal benefits analysis), net present value (at 4 per cent, 6 per cent, 8 per cent, and 10 per cent), and internal rate of return. The minimum acceptable rate of return was set at 8 per cent.

The monetary returns measures produced as a result of the research support the conclusion that the three year program in vocational education teacher training is the best investment alternative for potential investors from the four trades occupations included in the study. Also, using the 8 per cent guideline, the academic teacher training option was found to be a worthwhile investment for senior stenographers and beauticians, while the engineering training option was found to be financially attractive for automotive mechanics. Construction electricians may consider engineering training as a valid investment alternative to vocational education teacher training, especially if the benefits data used in the study were underestimated.

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CHAPTER I

THE PROBLEM

I. INTRODUCTION

Assessing the Canadian educational scene in the late 1960's, the Canadian Education Association reported the following nation-wide developments:

- (a) the growth of community colleges, or post-secondary non-degree granting institutions,
- (b) the consolidation of smaller school districts into larger units of administration for improved financial control and program offerings,
- (c) increased educational expenditures in all provinces,
- (d) an expansion of Federal-Provincial adult retraining and vocational programs in all regions of the country,
- (e) a trend towards large comprehensive schools,
- (f) greater attention to special education for trainable mentally retarded children (1, p. 81).

Taken together, these developments are symptomatic of the massive transformation of the Canadian educational system in the past decade. Separately, the principal thrusts were in a variety of directions: the diversification and specialization of programs and services; the reorganization and extension of administrative units; and the promotion of adult participation in continuing education.

The support for this change process came from two

interrelated sources: a new-found faith in the importance of education for economic growth, and the general buoyancy of the national economy. The Economic Council of Canada, in its Second Annual Review, Towards Sustained and Balanced Economic Growth, underscored the first source of support in these terms:

We recommend that the advancement of education at all levels be given a very high place in public policy, and that *investment in education* be accorded the highest rank in the scale of priorities (7, p. 171) (*Italics added*).

On a more specific level, the Economic Council recommended that attention be given to post-secondary education, physical plant and professional resources, adult upgrading and continuing education, educational research and teacher training, and business-labour-education cooperation (7, p. 171).

The second source of support for educational expansion, that is, the buoyancy of the Canadian economy, can be illustrated by the willingness of Canadians to expend ever-increasing amounts of their financial resources on educational goods and services. Some evidence of the magnitude of the expenditures in the post-war era is provided by Hanson (10), who, in 1966, stated:

In 1945, the year in which the Second World War ended, the total Canadian expenditure on formal education was \$195 million. Within 20 years this level of expenditure has increased sixteenfold to an estimated \$3,180 million in

1965. In per capita terms the rise has been tenfold, \$16 to an estimated \$162. By reference to the gross national product there was a rise from 1.6 per cent to an estimated 6.2 per cent between 1945 and 1965, and in terms of personal income from 2.0 per cent to an estimated 8.3 per cent. For the whole period, 1945-65, the average annual rate of increase was 15 per cent, implying a doubling every five years (10, p. 49).

The reasons cited for these burgeoning rates of expenditure are many, and they include: the inflationary pressures of prices and salaries, the rising enrolments at all levels of schooling, the expanding instructional and administrative staff, and the improving physical facilities (10, p. 49). It is worth noting as well that the holding power of the educational system had improved considerably. Not only were there more students enrolled in a greater variety of programs and courses, but they also remained in the educational system for longer periods of time (13, p. 18). Indeed, the significant influence of the continuing education movement was freely attested to by the emergence of community colleges, technical institutes, and vocational high schools in all regions of the nation.

The major impetus for the development of technical-vocational education throughout the 1960's was provided by the federal government's Technical and Vocational Assistance Act of 1960. In effect from 1962 to 1967, the Act made provision for the distribution of federal funds designated for both operating and capital expenditures associated with its nine programs and two related courses. The amounts of

federal expenditure ranged from a low of \$35.7 million for the fiscal year 1962-63 to a high of \$221.3 million for the fiscal year 1966-67 (5, p. 10).

The enrollment figures for the final fiscal year of the Act probably supply a satisfactory measure of the social demand for technical-vocational education across Canada. In the school year 1966-67, there were 556,000 Canadians enrolled in publicly-sponsored vocational classes on a full-time basis (5, p. 11). Of these, nearly half were in attendance at vocational, technical, composite, and commercial high schools as distinguished from institutes of technology and apprenticeship programs (4, p. 1).

In Alberta, for the same year, there were 10,401 full-time high school students enrolled in vocational education courses. This figure excludes those enrolled in vocational business education courses (2, p. 3). If the vocational business education students are added in, the total enrolment for vocational high school courses is raised to 16,636 (5, p. 11).

These figures suggest implications both for the anticipated improvement of national labour-force productivity and the development of vocational education teacher training programs within the individual provinces. The former implications have been analyzed in some detail by the Economic Council of Canada, particularly in its Second (7) and Fifth (8) Annual Reviews, and have to do mainly with the direct and

indirect benefits, economic and otherwise, which result from investment in education. The latter implications, that is, those concerned with teacher training programs, are of immediate consequence here.

Most of the provinces have met the demand for vocational education teachers by developing special programs in conjunction with existing teacher training institutions. The main exception to this procedure is found in the Atlantic region. In this case, the provinces of Newfoundland, Nova Scotia, Prince Edward Island, and New Brunswick have combined their resources to establish a vocational education teacher training centre in Moncton, New Brunswick (5, p. 56).

The approach adopted by Alberta is typical of that to be found in the remaining six provinces. In the Province of Alberta the general teacher training function is performed exclusively by the faculties of education of the three provincially-sponsored universities. While each of the three faculties is charged with meeting the general demand for teachers at the elementary and secondary levels, and in a broad range of specializations, it is only in the Faculty of Education, University of Alberta, that a special program exists for the recruitment, training, and certification of those prospective vocational education teachers who have had both trades training and work experience.

Known as Vocational Education Program, Route 1, this special instructional program makes provision for vocational

education teacher training to the Bachelor of Education level. The entrance requirements for admission to the Route I Program are contained in Appendix A and will be considered in more detail in Chapter III. It is sufficient to note at this point that potential candidates for admission must have, in addition to matriculation standing, trades training and work experience in either designated or non-designated trades. Designated trades are those which come within the terms of reference of the Alberta Apprenticeship Board, while non-designated trades are those which do not (Appendix C). The trades training may vary from one to four years, with four years being the mode; while the work experience required is either five years or nine years. The five year criterion applies to designated trades and the nine year criterion to non-designated trades.

Two significant consequences follow from these entrance requirements. First, the participants in the Vocational Education Program, Route I, tend to be somewhat older than other Faculty of Education students entering either from the high schools or from other faculties. Second, their earnings years as teachers are reduced to a marked degree. The first consequence has certain socio-psychological implications, while the second is of definite interest within the field of economic analysis.

II. STATEMENT OF THE MAIN PROBLEM

The Social Demand

The Vocational Education Program, Route I, Faculty of Education, University of Alberta, may be conceptualized at the institutional level as the mediation point for the supply of properly qualified tradesmen on the one hand, and the social demand for vocational education teachers on the other. The relationship is presented diagrammatically in Figure 1.

Also impinging on the mediation point are a number of social agencies representing the special interests of their constituents. The main agencies are: the Department of Manpower and Immigration, the Alberta Teachers' Association, the Alberta Apprenticeship Board, and the Department of Education. Representatives from each agency, along with those from the Faculty of Education, constitute the Admissions Committee. The admission policies will be outlined in Chapter III. In the meantime, it is sufficient to note that the committee controls the flow of personnel from the supply to the demand side.

That a social demand exists is evident from the enrolment figures cited in the preceding section and may be further substantiated by reference to the expanding array of vocational courses being offered in a growing number of vocational and composite high schools throughout the province

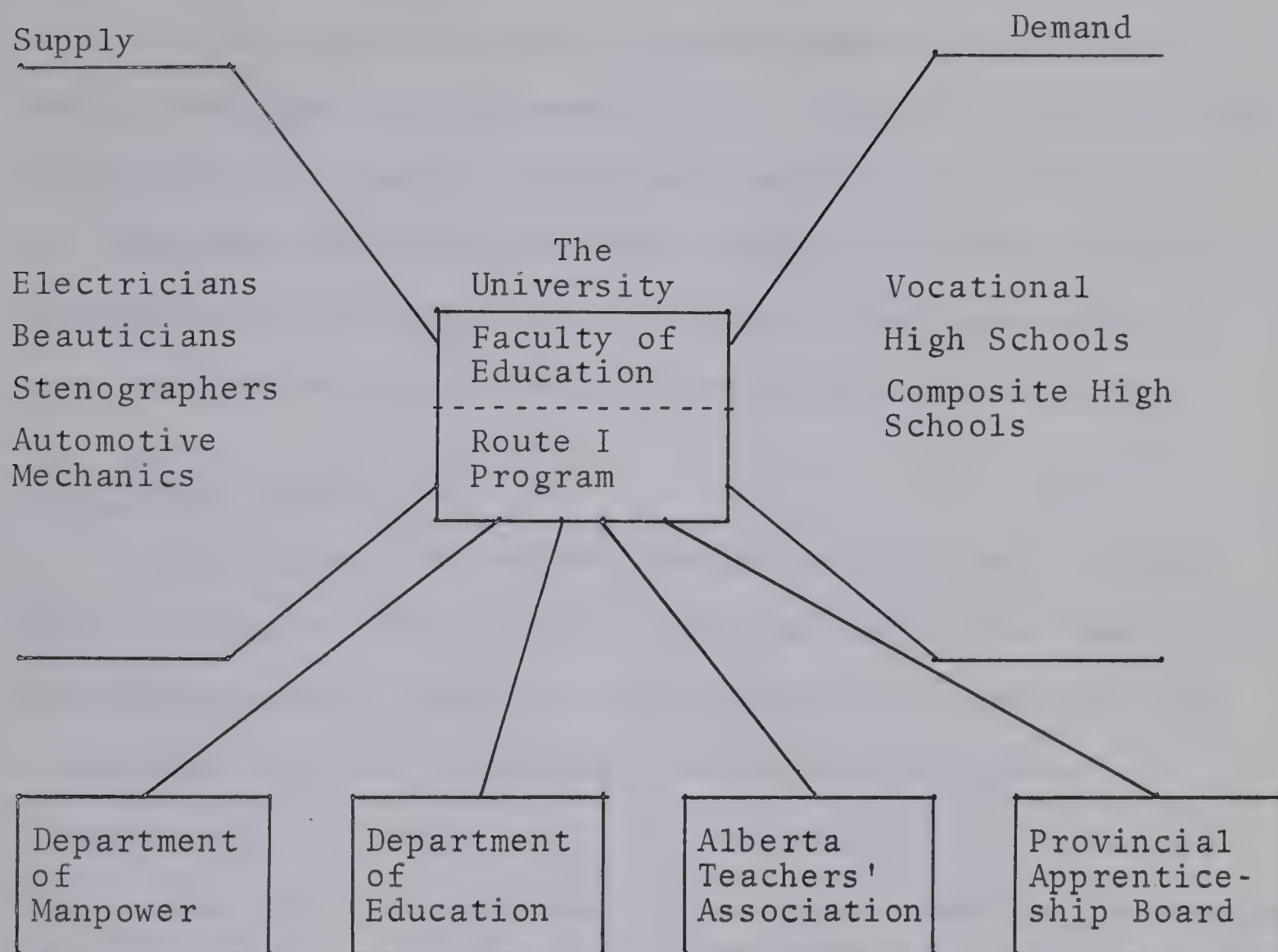


FIGURE 1

VOCATIONAL EDUCATION, ROUTE I, RELATIONSHIPS

(2, p. 1). Examples of the latter are presented in Appendix F.

No doubt fulfilling the social demand results in many private and social benefits. At least this is the view of the Economic Council of Canada quoted above. Hopefully, the graduates of vocational high schools will have acquired knowledge and skills which will enhance their own earning power and the economic productivity of Canadian society.

The Private Decision

Turning now to another level, that of the vocational teacher trainees themselves, participation in the Vocational Education Program, Route I, can be viewed as the result of a critical decision involving a shift from previous occupational activities and earnings to the furtherance of formal education and eventual entry to the teaching profession. The decision is described as critical since it requires a *second* occupational choice within the individual's lifetime.

Implied in the decision to obtain not only additional education, but also education of a different *kind* are monetary costs of a social and private nature. Both sets of costs may be conceptualized as investments in the future; one set on behalf of society, the other on behalf of the individual. Society's direct benefits will be in the form of increased productivity, while the individual's direct benefits will consist of higher earnings (3, p. 33).

The Problem

The study reported herein focused on the private monetary costs and benefits and viewed the educational decision of the potential vocational education teachers from the perspective of investment theory in terms of human capital formation. In brief, the inquiry sought to answer the following question: What are the estimated monetary benefits accruing to individuals from a variety of occupational backgrounds who decide to become teachers by means of the Vocational Education Program, Route I, Faculty of Education, University of Alberta?

III. STATEMENT OF THE SUB-PROBLEMS

In designing the research it was considered desirable to subdivide the main problem into a series of sub-problems for purposes of analysis and comparison. Subsumed under the general statement of the main problem were six sub-problems:

- (1) To what extent do the estimated monetary returns vary with occupational background?
- (2) To what extent do the estimated monetary returns vary with sex?
- (3) To what extent do the estimated monetary returns vary with age of entry to vocational education teacher training?
- (4) To what extent do the estimated monetary returns vary with the number of years of training as a

vocational education teacher?

(5) To what extent do the estimated monetary returns vary in comparison to alternative university programs?

(6) To what extent do the estimated monetary returns vary with successive decisions to move from one level of vocational education teacher training to another?

These six questions led to the formulation of forty-two cost-benefit problems which, in turn, were subjected to *additional lifetime earnings, net present value, and internal rate of return calculations*. Further elaboration of the forty-two problems and the definitions of additional lifetime earnings, net present value and internal rate of return are contained in Chapter III: The Research Design.

IV. SIGNIFICANCE OF THE STUDY

It is not intended at this point to review the literature of the economics of education, in general, or of rates of return to education, in particular; that will be done in Chapter II. What is intended, however, is: (1) a general statement about rate of return studies in relation to research data, theoretical basis, and methodologies; and (2) a specific statement regarding the significant differences to be found in the research project reported here.

Even the most casual exposure to the body of literature

covered by the rubric: monetary returns to education leaves the impression that it is a field of economic theory and empirical research which may be best characterized by such terms as 'dynamic activity' and 'explosive growth'. Indeed, the rate of return approach has been applied to education-income data in the United States, Great Britain, Israel, India, and Canada -- to mention but a few places. The data have ranged from the total male population of a nation, as in Hansen's study in the United States (9), to the male and female college population, as in Stager's study in Ontario (15); to the male graduates in educational administration, University of Alberta, as in Dupuis' study (6).

Regardless of the size of the populations studied or of the limitations of the data used, the central purpose of all rate-of-return studies is to measure the economic effects of greater (lesser) amounts and kinds of education viewed as an investment in human capital formation. At base, the theoretical argument goes like this: Education is a good on which individuals and society decide to spend money. If it is a good, the benefits of which are to be acquired sometimes in the future, then it is a producer good rather than a consumer good. Thus it can be conceived of as an investment in much the same way that expenditures on physical capital goods are investments aimed at profitability. If it is an investment in capital formation, then it should be possible to measure its outputs in monetary terms. Given this

rationale, the obvious place to look for the outputs of educational investment is in the realm of increased earnings.

The methods used to measure educational investment outputs vary to some extent, but, in general, they all involve an analysis of costs (expenditures) and benefits (earnings). On some occasions the researcher is primarily concerned with private costs and benefits (6), on other occasions he may attempt to measure both private and social costs and benefits (9). The value of the educational output may be expressed in a variety of ways: external rate of return (16), additional lifetime earnings (11), net present value (18), internal rates of return and benefit/cost ratios (15). Each value expression has its own utility for the assessment of educational projects at either the private or societal level of decision making and planning. For example, knowledge of the external rate of return would be useful to the individual who is making the choice between investment in further education and the purchase of Canada Savings Bonds at eight per cent per annum. The rational choice, in an economic sense, would be for the person to invest in further education if the present value of the additional lifetime earnings associated with more education are not reduced to zero by discounting at eight per cent. The other terms, that is, net present value, internal rates of return, etc., are defined in Chapter III.

Turning now to the significance of the study reported here, it may be logical to ask: Why another research project on the monetary returns to education? In what way is it different? The answers to these questions lie neither in the theoretical framework nor in the methodology, both of which are more or less standard for studies of this kind. Instead, they are to be found in the nature of both the population data and the costs data.

Most studies on the monetary returns to education view education as a continuous process which terminates at certain normal age levels. For example, secondary education terminates at age eighteen and post-secondary education at age twenty-two. The equivalence of age and education levels is not one of convenience, but rather a matter of necessity in the estimation of lifetime earnings streams.

This principle of continuity, however, does not apply to the Alberta tradesmen who decide to become vocational education teachers. As already noted, the admission regulations for the Route I Program are such that the minimum age of entry varies from twenty-four years to twenty-nine years. The study attempted to determine the effects of late entry to vocational education teacher training in monetary terms. To this extent, the study viewed the Alberta tradesmen as the vanguard of the growing army of those who will need upgrading and retraining as a consequence of technological change (18, p. 11). The central concept here

is that the location of the decision point along the time dimension has important implications for the tradesman as educational investor. The later in life the educational decision is made, the less likely it is to be profitable.

The second significant feature of the research data has to do with the costs of education. The standard direct and indirect private costs were included, but these were reduced by what were designated as negative costs. Since the first year of the Route I Program is subsidized by both local school jurisdictions (bursaries) and the federal government (subsistence allowances and tuition fees), it was thought desirable to measure the effectiveness of the subsidization by processing the data both with and without the negative cost factor.

The findings of this study have relevance in four areas. Firstly, qualified tradesmen who are contemplating teacher training as an occupational alternative may be given valuable information on which to base their decision to invest in themselves and their future. Secondly, social policy makers, especially those responsible for the formulation of bursary and subsistence support, may be provided with guidelines for future policy readjustments. Thirdly, salary negotiators, teachers and trustees alike, may find the results to be of some value in the collective bargaining process. Finally, there should be a number of conclusions and questions arising from the study which would

be germane to the development of both economic theory and further research. The questions may well be of the social psychological variety, as well as economic and political.

V. SUMMARY AND OVERVIEW

Chapter I has presented the statement of the main problem of the study. The main problem was developed, in terms of its origins, both within the broader context of Canadian educational-economic development and within the narrower context of a specific program for the training of vocational education teachers. The sub-problems related to the main problem presented the major variables considered in the study.

The remaining five chapters contain the study itself. Chapter II develops a review of the theoretical and empirical background, while Chapter III explains the main determinants of the research design. Chapters IV and V present the cost-benefit data and their analysis. The final chapter, Chapter VI, draws some conclusions apropos of the sub-problems and indicates the implications of the study.

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CHAPTER II

THE THEORETICAL-EMPIRICAL BACKGROUND

I. INTRODUCTION

The objectives of this chapter are threefold: to develop the central concepts of the economics of education, especially as these relate to investment in human capital theory; to summarize some of the findings of monetary returns to education research; and, finally, to consider some of the problems associated with the general assumptions underlying this kind of research.

In order to accomplish these ends, it has been considered desirable to outline briefly the literature on the economics of education, realizing all along that such an undertaking is becoming increasingly more difficult (8, p. 102); to select, for purposes of illustration, certain representative research studies of a general and special nature; and to present the major theoretical assumptions and to discuss some problems associated with their use.

II. THE ECONOMICS OF EDUCATION

Perhaps the most appropriate starting point for a discussion of the ever-expanding literature on the economics of education is to distinguish it from the equally voluminous literature on educational finance (19, p. 1). Although both

sets of literature share a common interest in the economic aspects of education, they differ significantly as to their formal perspectives, motivating purposes, and analytical procedures.

The literature of educational finance generally focuses on the perennial problems of revenue and expenditure as these relate to the efficient functioning of publicly-supported school systems. On the revenue side, considerable attention is given to the topic of taxation: its principles, sources, and distribution. In regard to the latter, various systems of grants, such as the school foundation program, are usually formulated and clarified. On the expenditure side, the concern is with such topics as teachers' salaries, and the costs of administration, physical plant and equipment, transportation, and technological innovations. Since teachers' salaries generally account for half or more of school expenditures, this topic is subjected to close scrutiny. Usually the analysis leads to an appraisal of merit rating for pay schemes.

Much of the writing in the field of educational finance has been done by professional educators. Typical here are works by such men as Burke (10), and Mort (25), both of whom have produced what might be called a classical analysis of the problems inherent in the financing of public education. It is interesting to note, however, that these analyses of public school revenues and expenditures are, to a

large extent, performed in abstraction from the total economic system (22, p. 27). That is to say, they do not take into account the ramifications of the private sector-public sector relationship. Education is simply seen as a public good which requires the expenditure of large sums of money by the state at its various levels. Solutions are then sought for two problems: how to get more revenue and how to distribute it most equitably, both to the school systems and within the school systems.

It is only within the past decade or so that professional educators have been pressured into taking a broader view of the relationship between the educational system and the total economy (23, p. 153). The pressure itself has originated from two sources. Firstly, there has been the intensified competitiveness for the tax dollar caused by the increased demand for more and better governmental services (3, p. 160). This has led to attempts at justification for educational costs that go beyond the mere statement that the educational enterprise is its own justification. That is to say, it is no longer possible to assume that expenditures on education will continue to expand simply because it is a good thing. There is a burden of proof, particularly in view of continually changing social and private priorities.

Secondly, professional economists themselves have started to take a greater interest in education and its

effects on economic well-being, both for society and individuals (9, p. 15). This new emphasis does not mean that economists, even as far back as Adam Smith (30, p. 265), had been unaware of the education component in the analysis of economic systems. After all, it would have been difficult to ignore expenditures of this kind either at the national or private levels. However, despite the occasional emergence of the concept of human capital in the writings of classical economists (31, p. 45), educational expenditures have been traditionally accounted for in terms of consumption rather than production. In this view, the costs of education are seen to be borne by the public and by individuals because of their utility value in the present and not because of their production of future benefits (31, p. 47). The student, in other words, would receive immediate satisfaction from the expenditures on his behalf in much the same way that consumption of an ice cream cone would result in satisfaction.

The initial impetus for the view of education as a production factor in the economy was supplied to a lesser degree by *income structure* studies and to a greater degree by analysis of the *economic growth* phenomenon. The former studies attempt to solve the problems surrounding the uneven distribution of income among the population of a nation. At base, they ask the question: Why is it that some people earn more money than others in a lifetime? The answers found, simply stated, are that some people have more education than

others, and that the amounts and quality of education possessed are largely determined by the social class into which a person is born (24, p. 135).

Economic growth studies, on the other hand, seek to explain the economic expansion which occurs in modern industrial societies by means of analysis of the factors of production. Studies of this nature, for example, by Denison (14) and Schultz (29) in the United States, and Bertram (4) in Canada, indicate that the economic growth phenomenon cannot be explained satisfactorily in terms of physical capital investment plus the numerical expansion of the labour force (30, p. 42).

This revelation led Schultz (28) to propose, in an article entitled, Investment in Man: An Economist's View, his now-famous human capital hypothesis. Here Schultz argues that the conventional notion of capital formation is no longer adequate for the analysis of economic growth (28, p. 110). He advocates expansion of the concept of capital to include investment in human beings by means of education (28, p. 111). All along, however, he is cognizant of the reluctance with which this innovation will be received, both by people in general and by economists in particular (28, p. 109).

The Schultz hypothesis was so radically unorthodox that it first appeared in a welfare journal rather than, as one might expect, in a journal of economics. Nonetheless, it

was at least partly responsible for the establishment of what Bowman has called "a new faith" (9, p. 15); a faith with adherents among the ranks of planning technicians, politicians, academic researchers, and professional educators. Its name is the economics of education and its "core concept ... is that of investment in human beings" (8, p. 103). Taking a somewhat less enthusiastic position, Coleman (12) compares the theoretical and research activities made in the name of the economics of education to a "Great Debate", in which there are a variety of orientations, methodologies, and special interests to be defended (12, p. 480).

Perhaps the Coleman analogy is more accurate than Bowman's in that it underscores the differences rather than the similarities of the basic commitments of those involved. That there are important differences on the part of economic theoreticians and researchers interested in the economics of education is evident from the variety of approaches which have been formulated and applied in an ever-increasing number of studies (8, pp. 101-102).

While there is some overlapping of the techniques of measurement found in the approaches to the economics of education, each does have its own set of identifying characteristics. On the basis of these characteristics, it has become conventional to use a fourfold classificatory system: manpower forecasting, correlational analysis,

residual analysis, and rate of return or cost-benefit analysis (7, p. 68). Subject to its own limitations, each of the four approaches attempts to analyze the relationship between educational and economic factors.

The first three approaches are outlined briefly in the remainder of this section. The fourth approach was used in the research investigation reported here and will be examined in more detail in the succeeding section.

Manpower Forecasting

The manpower forecasting approach -- also known as manpower planning and manpower needs -- differs in at least three significant ways from the other approaches. Firstly, while it takes into account past and present educational-economic behavior, its principal time orientation is towards the future, especially the long-range future. Hence, there is a considerable need for accuracy of estimation in view of the uncertainties of free future contingencies. Bowen suggests that these types of projections might tend to understate the case (7, p. 97).

Secondly, the manpower forecasting approach makes no attempt to measure or evaluate the contribution of education to the economic growth of a nation (7, p. 96). The expanding supply of educated persons is accepted as a given. What remains as a problem for the manpower forecasters is to determine what occupational roles will exist in the future.

The means used to assess the nature and magnitude of this future demand have been examined and explained by Wilkinson (38, pp. 32-42).

Finally, there appears to be greater emphasis, at least among Western manpower forecasters, on the distinction between education (general) and occupational training (specialized skills). In this regard, it is generally held that, in those economic systems which have a large private sector, the schools will provide the education, while the business-industrial institutions will provide the training (20, p. 683). Of course, in nations where both the educational and economic structures are closely interwoven with political structures, there is little difficulty in combining education and training to meet the occupational demands of the economy (35, p. 594). Indeed, even the problem of projecting fairly accurate job specifications is made easier in such circumstances (35, p. 596).

The main assumption underlying the manpower forecasting approach is that there is a direct relationship between educational development and economic growth, even though, as Harbison cautions, "... planners should be wary of accepting it without scrutiny" (20, p. 681). Coleman lends his support to this note of warning, particularly in reference to the application of manpower methods in economic planning for underdeveloped countries. He states:

Rapid educational expansion does not necessarily give rise to either economic growth or political stability; economic growth has occurred without extensive educational development, and, in many instances, it has been politically destabilizing. To be sure these incongruities in development among the various spheres are regarded as transitional; it is assumed that in the long run some sort of adjustment or balance will be achieved. But the long run can prove to be very long indeed (12, p. 481).

Although Coleman, in this case, is principally interested in the political consequences of manpower planning, he does not ignore the basic assumption of a linkage between educational and economic development. He goes on to state that there can be an "overproduction of the educated" both in terms of *types* of education and *stage* of development of a country (12, p. 480). In the same vein, Eisenstadt hypothesizes that in fully developed industrial nations the supply of educated persons will always exceed demand for their services due to restrictive access to occupational roles (17, p. 119). If the hypothesis is true, then the rates of return to investment in education would necessarily decline (30, p. 43).

There are at least two additional difficulties associated with manpower forecasting techniques when these are applied in federal countries with large private sectors. The federal system of political organization often means that the governmental agencies performing the forecasting (and consequent planning) do not have direct control over

the education system. It is this factor, plus the fact of the time lag between job specification changes and appropriate educational adjustments, that gives rise to the suggestion that training, as distinct from education, should take place on the job.

The private sector problem is even more intractable in that the information needed for projections must be gathered from a large number of competing firms and individuals. Even though they may be willing to disclose the past and current performances, it is rather unlikely that they would be equally openhanded with regard to future plans involving technological changes and manpower needs. After all, such information has implications for future profits.

Correlational Analysis

Unlike manpower needs studies, which attempt to look into the future in order to determine occupational demands, correlational analysis looks into the past, in the sense that the behavior has already occurred, the choices have been made. The signs of these choices or decisions are provided by the statistical records of educational and economic variables for a population. The correlational analyst thus makes statistical comparisons of variables, either stock or flow in nature, associated with educational and economic activities. He may, for example, determine the level of

correlation between the rate of pupil enrollment as a proportion of the population and rates of growth of the G.N.P. Here the comparison would be over time and within the country. Correlational comparisons may also be made on educational variables and economic variables between countries and over time, and between regions and over time within the same country (22, pp. 32-37).

The assumptions underlying correlational analysis are those associated with parametric statistics. Of the four commonly recognized parametric assumptions, the one which education-economic correlational analysis finds most difficult to satisfy is that of homogeneity of variance. Compliance with this assumption means that the units of measure used must be substantially equal in value from one time to another, and from one place to another. If, for example, the school year is being used as a measure of educational input, it may not mean the same in 1969 as it did in 1929 within the same country or from one country to another. The same limitation applies to the use of monetary values between countries and over time (37, p. 125). One consequence of this limitation is the practice of making compensatory adjustments in order to establish equivalent or 'real' values.

Probably the major pitfall of correlational analysis is that it does not establish a causal relationship (35, p. 595). As is often the case in Western industrial nations,

there is a high positive correlation between the rate of educational expenditures and augmentation of the G.N.P. To argue for policy purposes that this proves more money should be expended on education is no more defensible than to argue that more should be expended on health, which also has a high correlation with economic growth.

Given these limitations, only guarded inferences can be made on the basis of correlations of educational and economic variables. They are, however, of some value in making comparisons between the educational inputs of developing countries, although they take no account of the efficient use of inputs (37, p. 194).

The 'Residual' Approach

Attempts are continually made to formulate analytical systems that go beyond the rather tenuous procedures and conclusions of correlational analysis for purposes of demonstrating more accurately the contribution of education to economic growth. One such analytic system is that developed by Edward F. Denison (14), an American economist. Described by West (37, p. 106) as the "more modest approach", Denison's analytical system seeks to separate out those components of the growth rate, within a given country and over time, which can be attributed to education (14, p. 315 ff).

The initial focus of the analysis is on those economic output factors, such as physical capital formation and labour

force expansion, which can be clearly identified in quantified values. If the sum of these growth components equals the growth rate for the period under consideration, as expressed by the G.N.P. or National Income, then there is no 'residual' component or factor. If, on the other hand, as Denison discovered in his analysis of U.S. data for the periods 1909-1929 and 1929-1957, they do not equal total growth, then there is a 'residual', that is, a remainder. Denison ascribed a large portion of the residual observed as a result of his analysis to the influence of the improved educational status of the U.S. labour force. In fact, he assumed "... that differentials in labor earnings due to differences in education equal 60 per cent of observed differentials in money income ..." (21, p. 29). Of course the '60 per cent' assumption is arbitrary and its use would have significant impact on any further estimations of the contribution of education to economic growth (2, p. 35).

West, in his critique of residual analysis, objects to what he maintains is an over-estimation of the influence of education in "the mysterious residual". He states:

Other important influences are also probably at work, and these include improvement in quality of capital assets, possibly a lower level of taxation, the economics of large scale, improvements in industrial relations and in health of employees, and a fall in the price of imports. And even when we get to education we have to remember all the varieties of non-formal education ... (37, p. 106).

Despite the limitations, many of which are well known to Denison (13), the residual approach has been subjected to considerable refinement and has been used in comparisons of economic growth between countries. Bertram (4) made a recent application of the method -- on behalf of the Economic Council of Canada -- for the period 1950-62. It is interesting to note that, for Canada,

... the gains from education were so small (.2 per cent of a growth rate of 3.8 per cent) that they were offset by the effects of the changing age and sex composition of the labour force (-.1 per cent) and of declining hours of work (-.2 per cent) (16, p. 14).

This finding is indicative of the time lag which occurs in making investments in education.

III. INVESTMENT THEORY AND EDUCATION

The fourth type of economic analysis which has been applied to education-related data is that known as cost-benefit or rate of return analysis. It has been called, sometimes in a pejorative sense, 'the investor's view of education' in that it relies on the components and techniques of investment theory. Since rate of return analysis was originally developed as a method for evaluating physical capital formation problems, it is probably better to focus on this topic first and then proceed to a consideration of the concept of investment in human capital formation.

Investment in Physical Capital

The all-important question in any problem concerned with investment of money in the formation of physical capital is simply: Will it pay? (11, p. 224). The 'it' under consideration may involve something as small and relatively insignificant as the purchase of an additional aircraft by an airline, or the 'it' may be the proposed development of a whole new generation of aircraft such as the supersonic transport (34, p. 79). In either case, whether the potential investor is an individual, a business firm, or a governmental agency, he must make the decision to invest on the basis of the desirability of the alternatives, even if one of the alternatives is merely to do nothing.

In making an investment decision the investor can act in one of two ways: he can play a hunch on the basis of vague information and guesses about the future, or he can obtain all of the information concerning costs and probable benefits and make a mathematical estimate of future possibilities. In both cases, it should be noted, the future remains problematical and is not made certain by the precision of mathematical calculations (11, p. 225). Nevertheless, whichever approach is used, investment theory posits the existence of a rational calculus, that is, the making of the investment choice on the basis of the probable maximization of profits over a given period of time (6, p. 168).

The cost-benefit or rate of return approach to an

investment in physical capital formation seeks to establish a basis for evaluating the profitability of a project.

While a number of methods have been developed for this purpose, only four of the major methods are reviewed here.

Marginal benefits analysis. The simplest method for determining the feasibility of an investment project is that which uses only costs and benefits data, and projects them over a specified number of periods. The difference between the costs and the benefits for each period, assuming the benefits to be greater, would constitute the marginal benefits. These, in turn, would be summed to produce the total marginal benefits to the end of the specified number of periods. By this means it is possible to get a lump sum view of the investment. Although the marginal benefits method has some value for comparison purposes, its main limitation is that it fails to take into account the time value of money. Indeed, the benefits which accrue may be so far in the future that the immediate costs become a prohibiting factor.

Net present value analysis. The net present value method uses the costs and benefits data found in marginal benefits analysis plus a minimum acceptable discount rate. The costs, both initial and continuing, and the benefits, including increased revenues, depreciation allowances, and lower costs, are projected for each period to the end of the

specified number of periods. The marginal differences between the costs and the benefits for each period are then discounted on the basis of the acceptable rate, adjusted for time, back to the investment decision point. The time adjustment of the discount rate may be simplified by the use of Present Worth of 1 Per Period tables (11, p. 241).

The statement of net present value obtained in this manner represents the amount which would have to be invested now at the interest rate used for discounting, to produce the benefits of the proposed investment project. The discount rate, expressed in compound interest terms, while arbitrary, should be high enough to compensate for the risks involved in the investment (11, p. 225).

Internal rate of return. The internal rate of return is that discount rate which will make the costs over time equal to the benefits over time (11, p. 243). The components and mathematical computations used to find the internal rate of return are essentially the same as those used to find the net present value of future benefits. However, in this case, the discount rate is not predetermined, it is rather that rate of discount which reduces the net present value to zero. In investment terms, the internal rate of return discloses the interest rate up to which money may be borrowed for a project without incurring any loss. Its principal worth as an investment guide resides in the fact that

it shows the intrinsic value of a project.

The benefit/cost ratio. A fourth method for determining the feasibility of an investment project is that known as the benefit/cost ratio or the profitability index (11, p. 246). The benefit/cost ratio is determined by dividing the net present value of the total benefits by the net present value of the total costs, both discounted at an acceptable rate. If the ratio is greater than 1, the project is feasible; if less than 1, it is not feasible. The benefit/cost ratio method is of considerable value in ranking the profitability of alternative investment proposals.

The methods of evaluation described above have generally been used to assess the private returns to investment in physical capital formation and have seldom included the social consequences for either good or ill. However, given the current emphasis on pollution of all types, social costs and benefits are becoming crucial factors in determining the relative value of physical capital projects. Indeed, the hesitation on the part of the Americans in the development of supersonic transports has been caused, in part, by the diseconomies of 'noise' pollution (34, p. 79). Apparently the social costs outweigh the private benefits.

Investment in Human Capital

Investment theory is substantially the same in the domain of human capital formation as it is in that of physical

capital formation. Bowman summarizes the similarities in this manner:

Capital is something (a stock) that yields a flow of services over time. Whether the physical entity in which the capital stock is embodied can be bought and sold is a matter of degree (in modern terminology, degree of 'liquidity'), and is not a defining criterion. But resources put into schooling are (among other things) investments in the acquisition of potential future income streams, whether looked at from the individual or from the societal points of view. This is a kind of capital formation. It is the formation of human capital in that the stock that will yield the future income stream is embodied in human beings (8, p. 104).

Two points are of particular importance at this juncture. First, it must be emphasized that this is not an all-inclusive view of education, but rather a limited view; limited to the economic context of decision making. Nothing is said about the values of education in philosophical-moral-political terms. Second, the benefits measured are those which can be quantified as monetary values. This is not to deny the existence of other benefits which may accrue to the individual or society as the result of investment in education.

In sum, the development of capital embodied in human beings is viewed as a consequence of education. If given levels or kinds of education produce a certain monetary value, then additional education should result in an even greater monetary value. The resource allocation decision on the part of individuals to obtain more education is seen as the

result of a rational choice aimed at profitability. Blaug states that even if this is not so in the order of reality, the researcher must proceed *as if* it were (6, p. 168).

Bowman concurs (8, p. 112).

Given the necessary data, it is possible to calculate the additional (marginal) lifetime earnings, the net present value, the internal rate of return, and the benefit/cost ratio in order to appraise the feasibility of alternative educational investments. For the purposes of this study, the additional lifetime earnings, net present value, and internal rate of return methods of evaluation were used. The investment decision perspective adopted was that of the individual and the monetary benefits were assumed to be direct and private in nature. In addition, the projected earnings streams were not adjusted for taxation. The implications of this procedure will be discussed in Chapter V.

III. APPLICATION OF THE THEORY: SOME FINDINGS

Rates of return studies seeking to establish the economic value of education have been conducted by a number of economists in the decade since Schultz's elaboration of the human capital hypothesis. Some of the studies have dealt with both social and private rates of return, while others have concentrated only on the private investment level. In either case, however, the tendency has been

toward an emphasis on internal rates of return as opposed to the external rates of return approach used by Walsh (36) in his pioneering study. Nevertheless, the external rate criterion, in terms of an acceptable alternative investment rate, remains as a useful guide for discounting additional lifetime earnings to their net present value.

The data used in the earlier studies were generally census based and for the total male populations in various age-income groups. The central objective was to measure the economic effects of varying *amounts* or levels of education. These could be designated as general studies.

The more recent trend, on the other hand, has been toward the aggregation and analysis of data for different *kinds* of education. With this trend, the research focus has shifted to specific educational programs and their actual or potential participants. These could be designated as special studies.

Although it is not intended to provide a thorough review of rate of return studies, some findings from both kinds -- general and special -- are presented in Tables I and II. The six studies were selected for three reasons. Firstly, they illustrate the levels and kinds of education investigated. Secondly, they underscore the importance of the internal rate of return in this type of study. Finally, they give some notion of the wide-spread, in a geographical sense, interest in rate of return analysis.

TABLE I
GENERAL STUDIES

Researcher	Year of Data	Subjects and Levels	Findings			
Hansen (18) (United States)	1949	Schooling years (males)	Social R O R	Private R O R		
		Elementary - 2 yrs.	8.9 %	--		
		Elementary - 6 yrs.	14.5 %	--		
		Elementary - 8 yrs.	29.2 %	--		
		High School- 2 yrs.	9.5 %	12.3	%	
		High School- 4 yrs.	13.7 %	17.5	%	
		College - 2 yrs.	5.4 %	5.1	%	
		College - 4 yrs.	15.6 %	16.7	%	

Blaug (5) (Great Britain)	1963	General education (males)				
		High School- 3 yrs.	12.5 %	13	%	
		Higher Ed. - 3 yrs.	6.5 %	14	%	
		Combined six-year	8 %			

Podoluk (26) (Canada)	1961	General education (males)		Private R O R		
		4-5 years secondary schooling	--	16.3	%	
		University degree over Grade 8	--	17.1	%	
		University degree over High School	--	19.7	%	

TABLE II
SPECIAL STUDIES

Researcher	Year of Data	Subjects and Levels	Findings
Ashenfelter & Mooney (1) (United States)	1958-1960	Woodrow Wilson Fellows in Arts and Science beyond B.A. 3 - year Ph. D. 4 - year Ph. D. 5 - year Ph. D. 2 - year M.A.	Private R O R 10.8 % 9.1 % 7.1 % 7.5 %
Dupuis (15) (Alberta)	1962-1968	M. Ed. in Ed. Admin. Ph. D. in Ed. Admin.	Private R O R 10 % 13 %
Stager (33) (Ontario)	1961	All post-secondary education in Ontario University degree (males) Dentistry (highest ROR, males) Arts and Science (medium ROR, males) Social work (lowest ROR, males) - females Non-degree post-secondary institutions: Institutes of technology Provincial schools Teachers colleges	Social R O R 12.5 % 22.4 % 14.9 % 1.2 % 4.9 % 10.6 % 9.9 % 42.3 % Private R O R 15.4 % 30.2 % 17.4 % 0.9 % 8.0 % 12.9 % 13.3 % 78.6 %

By way of warning, it should be noted that all of the findings of each study are not included. For example, Hansen (18) not only derived social and private rates of return, as in Table I, but he also calculated additional lifetime earnings figures and net present values for the various levels of schooling. Stager (33), too, went beyond internal rates of return for the many groups and levels in his study. He derived both net present values and benefit/cost ratios on the private and societal levels.

A second caveat applies to Blaug's study (5). In this case a variation was made in the internal rate of return methodology. Blaug assumed that only 60 per cent and 66 per cent of the earnings differentials of high school and college students, respectively, could be ascribed to the influence of education. The remaining 40 per cent and 34 per cent could be attributed, in his view, to the influence of other factors such as innate ability and social class origins.

By and large, the findings of the six studies, Tables I and II, support the position that education is a worthwhile investment from the social and private viewpoints. The main exceptions are to be found in Stager's study where male social workers registered the lowest social and private rates of return. The female social workers fared considerably better because of the lower costs associated with earnings foregone during the period of training.

A characteristic which is common to most rate of return studies is that education is assumed to be a continuous process. The decisions to continue are conceptualized as being made at various age-grade levels up to the early twenties. With the exception of the Dupuis study, this observation is true of the studies outlined in Tables I and II. Little, if any, attention has been directed toward the problem of shifting from one kind of education to another or, indeed, to the problem of returning to the formal educational context after the continuity has been broken for some time. These two problems were of paramount importance in the inquiry reported here.

V. APPLICATION OF THE THEORY: SOME PROBLEMS

The application of a formal theory and its calculative techniques to cost-benefit data is one thing; the validity of its results may be quite another. In the matter of results, a large portion of the burden rests on the assumptions used. The objectives of this section are to state the main assumptions used in estimating the rates of return to education and to outline some of the principal arguments which have been raised against them. The chapter ends with a brief statement in defence of the assumptions.

In addition to the assumption of the rational calculus, or profit motive, in educational decisions, rate of return studies generally assume: (1) that increase in money income

is a satisfactory measure of private returns; (2) that private product is an adequate measure of social benefits; (3) that rates of return on physical and educational capital formation are conceptually similar; and (4) that analysis of cross-section data provides useful estimates for projecting future trends (21, p. vi).

None of the assumptions used in rate of return studies is a self-evident truth acceptable to one and all. Each of them has been subjected to criticisms by economists such as Renshaw (27), Shaffer (31), Vaizey (35), West (37), as well as by others who are not economists.¹ The criticisms themselves can be classified on the basis of the dominant perspective of the critic. Using this criterion, a threefold typology has been developed: (1) the philosophical perspective; (2) the socio-psychological perspective; (3) the economic perspective. The questions asked and arguments advanced within each category are reviewed in the sub-sections which follow.

The Philosophical Perspective

Those who oppose the economics of education in general and rate of return studies in particular generally do so on the grounds of two value judgements: one has to do with the

¹See, for example, Robert M. Hutchins, The Learning Society (New York: Praeger, 1968); Michael Harrington, The Accidental Century (Baltimore: Penguin, 1965).

concept of man, while the other has to do with the concept of education. In the first instance, they object to the reduction of man to the level of physical capital and all that that implies in terms of social engineering. This so-called humanistic viewpoint maintains that man is an end or good in himself and not a means (capital) to other ends (produced goods).

In the second instance, that of education, basically the same argument is applied, namely, that education is directed toward knowledge and knowledge is desirable for its own sake. They argue that the benefits of education for the individual and for society are often indirect and qualitative and, hence, are immeasurable.

The assumption that private (monetary) product is an adequate measure of social benefits probably results in more negative reaction than any of the others, except, of course, for the concept of human capital itself. One of the implications of this assumption is that social policy making may be based on the purely economic benefits of educational programs. From the philosophic viewpoint, it seems only fair to ask: If social policy decisions are to be made on the basis of investment returns to specific programs, what is to become of those programs which have desirable personal and social goals but which are not economically profitable? Does a low rate of return on investment in social workers, clergymen, nurses, and teachers mean that these types of

programs should be discontinued?

The Socio-Psychological Perspective

The issues raised within the socio-psychological perspective may be subdivided into two component parts on the basis of primary emphasis. In some cases the emphasis is on the individual -- his abilities, his motivations, and his personal drive. From this vantage point, it does not seem reasonable to assume that higher (lower) earnings are merely the consequence of more (less) education. The advocates of this position argue that financial success may well be the effect of innate ability and stamina, rather than increased amounts of schooling and training. Indeed, it is pointed out that even within occupational groups with high educational standards the range of earnings may vary greatly.

As for the issue of motivation, they underscore the inadequacy of the profit motive. That is to say, they question the fundamental assumption that persons make educational decisions purely on the basis of potential monetary returns. This, they argue, ignores both the consumption and the compulsory aspects of education. Besides, some persons may choose to pursue higher levels of education for altruistic reasons.

The sociological arguments generally focus attention in two directions: the influence of social class on the levels of educational achievement; and the influence of

occupational roles structures on earnings opportunities. On the one hand, it has been observed that social class origin is a major determining factor both as to the amounts and kinds of education achieved by society's members. On the other hand, occupational roles are ranked on an hierarchical or stratified basis and access to these roles becomes more difficult as both the quantity and quality of education increase in a given society. In this latter view, the earnings differentials associated with education may not disclose so much about the importance of education as about the conventional social stratification of society. In brief, the social classes are relatively fixed proportions of society and the social pressures created by increasing the educational stock of the population are counteracted by sharply rising standards of accessibility to upper occupational roles.

The Economic Perspective

Within the discipline of economics itself a number of difficulties emerge with regard to the assumptions posited in rate of return studies. Among these are: (1) the problem of education as an investment; (2) the problem of cross-sectional data.

The education-as-an-investment assumption implies that the costs of education are to be conceptualized in the same way as costs in physical capital investment. If all of

the costs are construed to be an investment in future productivity, that is, higher earnings, what is left over for the current consumption aspects of education? One answer to this question lies in the use of an adjustment factor which attributes an a priori, and arbitrary, amount of influence to both the consumption and production aspects. Another answer is simply to view all costs of education *as if* they were investments in future productivity. Of course, the inherent limitations of this latter answer must be recognized and remembered.

The cross-section data problem is common to all economic analysis and is, therefore, not peculiar to the economics of education. Briefly stated, the problem focuses on the static nature of cross-sectional data and, hence, questions their adequacy as a basis for projecting future possibilities. In the context of the economics of education, the problem becomes one of the absence of provision for future qualitative changes in education and, therefore, of changes in the earnings profile.

In Defence of the Assumptions

Reactions to the foregoing compendium of objections have been supplied by Blaug (5), Bowen (7), Bowman (8), and Schultz (30). In general, their arguments in support of the assumptions of the economics of education rely on an analysis of what constitutes economics and what constitutes education.

Taking the nature of education first, they indicate a common awareness of the non-economic, immeasurable aspects of education. However, they emphasize that there are also direct, measurable effects of education and among these are monetary rewards. This, in turn, leads to a consideration of one of the basic functions of economics, which is to measure that which is measurable about human behavior in monetary terms. The assumptions, along with their inherent limitations, are used as bases for approximating the effects of education from a special rather than a general point of view (8, p. 104).

They are also aware of the conceptual-technical problems within the field of economics itself. In regard to the problem of the concept of education as investment, it is freely admitted that there are probably psychic-consumption benefits attributable to education. They argue, however, that to admit this, is not to deny the capital formation aspects. Separating the two sets of benefits may be difficult, but this is no reason for maintaining that it should not be attempted (30, p. 7 ff).

Finally, as to the issue surrounding the use of cross-section data, Blaug sums up his position on the issue in this manner:

When all is said and done, cross-section data have a distinct advantage over genuine life-cycle data in that they are free from the influence of the trade cycle and implicitly provide estimates in money of constant purchasing power. Furthermore,

they reflect the way in which private choices are actually made; an average person forms his expectations of the financial benefits of additional years of schooling by comparing the present earnings of different occupations requiring various amounts of education, that is, by cross-section comparisons (5, p. 224).

Probably Blaug's second argument is more convincing than his first. In any event, the points made are illustrative of a defence made on behalf of the cross-sectional data assumption.

In the final analysis, there is no foolproof defence for the assumptions of rate of return studies. By definition assumptions are primary principles or starting points for research and demonstration. As such, they cannot themselves be demonstrated deductively; they are either accepted or rejected. Their validity resides in their usefulness as a basis from which to work in attempting to explain empirical phenomena. Given the antecedent nature and inherent limitations of assumptions, the researcher must function within these constraints and control his conclusions accordingly. In any event, that is the perspective which was adopted for this study.

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CHAPTER III

THE RESEARCH DESIGN

I. INTRODUCTION

There were seven general determinants which influenced the structuring of the research design of this study: (1) its purposes, general and specific; (2) the characteristics of Vocational Education Program, Route I, teacher trainees; (3) the cost-benefit methodology; (4) the assumptions; (5) the delimitations; (6) the limitations; and (7) the nature and sources of the cost-benefit data. The first six of these determinants are explained in the sections which follow. The seventh determinant, that is, the cost-benefit data, is outlined in Chapter IV.

II. THE RESEARCH PURPOSES

The general and specific purposes of this study are contained in the statements of the problem and the sub-problems presented in Chapter I. To review, the study attempted to determine whether or not the decision to become a vocational education teacher via enrolment in the Vocational Education Program, Route I, University of Alberta, is an economically sound decision in terms of monetary benefits. In other words, the research was aimed at discovering the level and extent of extra earnings, if any, which

accrue to individuals who choose vocational education teaching as a career. The point of view adopted for the purpose of the research was that of the private decision-maker investing in himself, as distinct from societal decision-makers investing in the capital formation of others (1, p. 103).

Six sub-problems were derived from the statement of the main problem. The sub-problems, in turn, focused attention on the six variables considered to be significant to the research. The first three sub-problems raised questions concerning the influence of occupational background, sex, and age on the costs and benefits of vocational education teacher training. These three variables were used as the primary control variables both for the classification of the trades types and for the estimation of lifetime earnings streams.

The occupational background variable. The vocational education teacher trainees, Route I, may come from a wide range of occupational backgrounds or trades areas (see Appendix A). In the light of this fact, it was necessary to limit the inquiry to a selection of four trades occupations. The four occupations selected were: automotive mechanic, construction electrician, senior stenographer, and beautician. The criteria used in selecting these four occupational backgrounds are explained in the next section.

The sex variable. The sex variable was perceived to be important for two reasons. First, many studies on the rates of return to education tend to concentrate on the earnings of males. Perhaps this is due to an absence of adequate data on female earnings. Second, in view of the universality of the single salary scale in Alberta school systems, it was considered likely that women would be better off than men, financially speaking, as a result of moving from a trades occupation to teaching. Indeed, in the business-industrial world it is, to quote Lydall, "... almost a universal law that, on an average, women receive only between half and two-thirds of the pay of men" (5, p. 55).

The age variable. The age variable was of particular significance in this study in that the actual ages of vocational education teacher trainees vary within a range extending from the mid-twenties to the early fifties. The lower limit is determined by the entrance requirements for the Route I Program; while the upper limit appears to be set by practical factors, including financial feasibility. The research reported here focused on the minimum ages of entry for the four occupational groups and on two successive five year intervals beyond the minima. To illustrate, the minimum age of entry to the Route I Program for beauticians is twenty-four years. The additional lifetime earnings streams for this group were discounted to ages twenty-four,

twenty-nine, and thirty-four.

The fourth and fifth sub-problems introduced the years of training variable and the alternative university programs variable to the study. On both of these dimensions it was assumed that there was only one decision point and that the decision maker would make one choice among a number of alternatives. In this way, the trades occupation earnings stream became the base stream for comparison to a wide range of other possible earnings streams.

The years of training variable. The training period for Route I Program vocational education teachers varies from one to three years. Upon enrolment in the Program, the teacher trainee is granted one year of teacher training in lieu of past trades training and work experience. Theoretically, the trainee may choose to remain for one year and complete the requirements for conditional certification; remain for two years and complete the requirements for professional certification; or remain for three years and complete the requirements for the Bachelor of Education degree. In actuality, the emphasis is on having the trainees complete only the first year in full-time residence at the university. At least this is the viewpoint adopted by the Department of Manpower.¹ The study, nonetheless, included

¹From interview with Mr. W. Zuk, Canada Manpower Centre, University of Alberta.

estimates of private costs and benefits for all three training periods options.

The alternative university programs variable. The alternative university programs variable provided for the possibility that the tradesmen may consider other avenues to higher education besides vocational education teacher training. On this basis, the estimated earnings streams of the two male occupations -- automotive mechanic and construction electrician -- were compared to the estimated earnings streams for three years of academic teacher training and for the four years of professional engineering training. The estimated earnings streams for the two female occupations -- senior stenographer and beautician -- were compared only to the estimated earnings stream for three years of academic teacher training. In all cases the earnings streams were adjusted for costs.

The sixth, and final, sub-problem added the concept of successive educational investment decisions to the study. Basically, it asked the question: What estimated monetary benefits would accrue to the vocational education teacher as the result of the decisions to move from one level of vocational education teacher training to another?

The successive decisions variable. Many vocational education teachers complete one year of the Route I Program and then enter the teaching force. This establishes them in

the earnings stream associated with two years of teacher training (one year of training having been granted). At some point they may decide to return for the second year, and a year later, for the third and final year of the program for the first degree. The assessment of these second and third decisions involved the comparison of estimated earnings streams within the vocational education teachers' salary structure.

III. CHARACTERISTICS OF ROUTE I TEACHER TRAINEES

Applications for admission to the Vocational Education Program, Route I, are processed by the Vocational Education Admissions Committee (Appendix A). The committee is composed of representatives from the Faculty of Education, the Alberta Apprenticeship Board, the Department of Education, the Alberta Teachers' Association, and the Canada Manpower Department. It is responsible for the formulation and administration of regulations governing entrance to the Route I Program.

Entrance Requirements

The basic requirement for admission to the Route I Program is possession of Alberta matriculation standing. Beyond this, the applicant must have undergone trades training, which may vary from one to four years, depending upon the specific trade (Appendix C), and either five years or

nine years of experience. The five years experience criterion is applied to designated (apprenticeship) trades, while the nine years criterion is applied to non-designated trades. Non-designated tradesmen, for example, stenographers, are not under the jurisdiction of the Alberta Apprenticeship Board. Nevertheless, it is expected that applicants from non-designated trades will show evidence of at least one year's specialist training beyond high school.

In addition to training and experience, it is generally required that the applicant possess an agreement of future employment with a school district and be eligible for the subsistence allowance provided under the regulations of the Occupational Training for Adults Division of the Canada Manpower Department (see Appendix B). Financial support, in the form of a bursary, is generally associated with the agreement of future employment.

When all of the conditions for admission have been satisfied, the applicant is granted one year of credit on a four-year Bachelor of Education in Vocational Education degree program. Successful completion of the first year of the Route I Program qualifies the vocational education teacher trainees for the Conditional Certificate granted by the Alberta Department of Education and thus eligible to teach in the province's vocational high schools. The regulations governing the Conditional Certificate are such that it cannot be made permanent and, consequently, they promote the movement

of vocational education teachers to higher levels of training (Appendix E).

Development of the Trades Types

While total enrolment in the Route I Program has varied from year to year (2, p. 59), that for the academic year 1968-69 was fairly typical. In that year there were 141 teacher trainees representing thirty-three different designated and non-designated trades areas. However, of the thirty-three trades areas represented, four could be considered as being dominant trades in that, taken together, they constituted over 50 per cent of the total enrolment -- 77 out of 141 teacher trainees. Three of the four dominant trades -- automotive mechanic, electrician, beautician -- fall within the 'designated' category, while the fourth and by far the largest -- business education -- is a 'non-designated' trades area. The four trades areas, to a large extent, reflect the demand for vocational education teachers in terms of the types of programs offered in the vocational or composite high schools (Appendix F).

Given the wide variety of possible occupational backgrounds and the necessity of limiting the study to manageable proportions, it was decided to limit the aggregation and analysis of the cost-benefit data to the four dominant trades areas. Using the male-female and the 'designated-non-designated' dichotomies, plus the education and experience

criteria for admission to the Route I Program, it was possible to derive four hypothetical types. This was done in order to establish minimum ages of entry to the Route I Program.

Although in theory all four trades areas are open to both males and females, in practice the males outnumber the females in the electrical and automotive trades, while the reverse is the case in beauty culture and, to a lesser degree, business education. Consequently, electricians and automotive mechanics were classified in the typology under male occupations, and beauticians and business educators' under female occupations. Since the business educators category proved to be too broad and vague for purposes of earnings data, it was further reduced to that of senior stenographers, as defined by the occupational classification system of the Alberta Bureau of Statistics, Annual Salary and Wage Rate Survey, 1968.

Characteristics of the Four Types

A description of each of the four hypothetical types of vocational education teacher trainees follows. In all four types, the senior matriculation requirement was assumed to be equivalent to eighteen years of age or twelve years of schooling. The remaining earnings periods are to age sixty-five. The numerals in brackets signify years.

- (1) Automotive Mechanic -- male, designated, matriculation (18), trades training (4), trades experience (5).
Minimum age of entry -- 27 years.
Remaining earnings periods -- 38.
- (2) Electricians -- male, designated, matriculation (18), trades training (4), trades experience (5).
Minimum age of entry -- 27 years.
Remaining earnings periods -- 38.
- (3) Beauticians -- female, designated, matriculation (18), trades training (1), trades experience (5).
Minimum age of entry -- 24 years.
Remaining earnings periods -- 41.
- (4) Senior Stenographers -- female, non-designated, matriculation (18), training (1), trades experience (9).
Minimum age of entry -- 28 years.
Remaining earnings periods -- 38.

Information concerning minimum ages of entry and the number of earnings periods remaining was essential for the estimation of lifetime earnings streams. It is interesting to note that beauticians have the largest number of remaining earnings periods and senior stenographers the smallest number for the four types.

IV. METHODOLOGY

The central objective of a rate of return study is to evaluate or appraise the relative merits of investment alternatives. The major evaluative methods for assessing physical capital projects were described in Chapter II. Included were: marginal benefits analysis, net present value analysis, internal rate of return analysis, and the benefit/cost ratio. The theoretical similarities vis-a-vis physical capital investment and human capital investment were also noted, as well as the fact that the first three of the methods were used for the purposes of this study.

At this point it is necessary to consider in more detail the evaluative methods in relation to human capital formation via investment in education. To this end, this section outlines the following: the definition of terms, the cost-benefit data components, and the calculation procedures.

Definition of Terms

A number of technical terms are associated with cost-benefit analysis. For the purposes of this study, the terms are used as defined herein.

Benefits. That which is gained in the form of additional earnings by individuals as a result of obtaining further education.

Costs. That which is expended by individuals in monetary terms in obtaining further education.

Foregone earnings. That portion of the cost which the teacher trainee could have earned had he remained in the work force.

Negative costs. Monetary assistance received in the form of bursaries and subsistence allowances.

Earnings, wages, salaries. That money received for labour or services, and not including rents, interest, dividends, gratuities.

Marginal earnings. That part of the earnings associated with additional levels of education.

Present value - discounted cash flow. That value of the benefits expressed in monetary terms when discounted to the decision point at selected rates of interest.

Internal rate of return. That discount rate which makes costs and benefits to be equal at the decision point.

External rates of return. Those discount rates derived from a comparison of alternative kinds of investment.

The Cost-Benefit Data Components

The necessary components for estimating and projecting the cost-benefit flows of human capital formation are similar to those used in the appraisal of physical capital projects: estimated costs, estimated earnings, a range of discount rates. There is, however, no allowance for depreciation, although an obsolescence factor may well be operative in the field of educational investment.

The specific data required are:

- (1) The age of the investor and, consequently, the expected working-life cycle to age sixty-five.
- (2) The time period or periods of the proposed educational program, in years.
- (3) The private costs of the educational program, including earnings foregone, tuition fees, registration fees, and other education-related expenses.
- (4) The negative costs, including bursaries, subsistence allowances, and remission of tuition fees.
- (5) The average lifetime earnings of the individual if he decides not to invest in the period or periods of education.
- (6) The average lifetime earnings of the individual if he decides to invest in the period or periods of education.
- (7) The interest rate or rates for discounting cost and benefit flows.

No provision has been made here for the inclusion of social costs and benefits data. This results from the adoption of the private decision-making level throughout the study. Furthermore, the earnings streams data are not adjusted for mortality, unemployment, or tax deductions. Adjustments of that nature, however, would be of major

importance in a study of the total costs and benefits of education at the societal level.

The Calculative Procedures

Two general criteria apply to the evaluation of an investment project (3, p. 14). First, it should be determined whether or not the benefits exceed the costs. Second, it should be shown that the best alternative has been chosen. These criteria may be met by using marginal benefits, net present value, and internal rate of return methods either singly or in combination with one another. The latter alternative provides a broader basis for the comparison of projects and it is for this reason that the three methods were used in the study.

All three methods utilize the costs and benefits data projected over time. The marginal benefits method, however, does not take into account the time value of money, while the other two methods do. For example, the marginal benefits of a project may accumulate to \$10,000 thirty years hence. This may look attractive, but it discloses nothing about the present worth of that amount of money; that is, the amount which would have to be invested now at an acceptable interest rate in order to produce \$10,000 thirty years from now. The net present value calculation would disclose the present worth. The internal rate of return calculation, on the other hand, would indicate the maximum rate of discount at

which both the marginal benefits and present value would be reduced to zero.

- (1) The formula used for calculating the marginal benefits or earnings is:

$$ME = \sum_{t=1}^n (E_t - C_t)$$

where ME is the undiscounted value of the marginal earnings stream, E_t is the earnings for period t , t is the period, and n is the number of earnings periods.

- (2) The formula used for calculating the present value is:

$$V = \sum_{t=1}^n \frac{E_t - C_t}{(1+r)^t}$$

where V is the present value of the marginal earnings stream, r is the discount rate, t is the period, n is the number of periods, E_t is the earnings for period t , and C_t is the costs for period t .

A range of discount rates -- 4 per cent, 6 per cent, 8 per cent, 10 per cent -- was used in the study to derive the net present values of the marginal earnings streams.

- (3) The internal rate of return is calculated by the formula shown for the net present value when $V = 0$.

V. ASSUMPTIONS

In order to conduct the analysis of vocational education teacher earnings by means of the cost-benefit or rate of return approach, it was necessary to make a number of assumptions related to: (1) investment theory; (2) the costs and benefits data; (3) teacher training as investment.

(1) It was assumed that investment in human capital formation is conceptually similar to investment in physical capital formation and that the investor, by means of a rational decision, would be seeking to maximize the output of investment in terms of further education.

(2) It was assumed that cross-section data, aggregated as averages, provide an adequate basis for the estimation and projection of costs and benefits, and that increase in average earnings is an acceptable measure of the private returns to education.

(3) It was assumed that teacher education and engineering education are investment goods and that no portion of the costs of further education would be associated with consumption.

VI. DELIMITATIONS OF THE STUDY

The study was delimited to the analysis of costs and benefits which might accrue to potential participants in the Vocational Education Program, Route I; in the academic

teacher training program; and, for males, in the engineering training program. The potential participants were restricted to four major trades occupations backgrounds in accordance with the characteristics of the four hypothetical types.

Marginal lifetime earnings streams were projected for the four trades occupations; one, two, three years of vocational education teacher training, with subsidies; one year of vocational education teacher training, without subsidies; three years of academic teacher training; and, for males, four years of engineering training.

Excluded from the study were a number of factors such as social costs and benefits, innate ability and social class influence, alternative vocational education teacher training routes, and alternative places of employment. In regard to the last exclusion, the earnings of vocational education teachers were restricted to the average salaries available from the twenty-seven Alberta school districts, divisions, and counties which employ vocational education teachers and make provision for so doing in their collective agreements.

Finally, the trades earnings were viewed as wages to employees. No provisions were made for ownership in the case of tradesmen, or for promotion to administrative positions in the case of teachers.

VII. LIMITATIONS OF THE STUDY

The limitations of this study are related to theory, the data, and the application of the findings.

It is recognized that the application of physical capital formation concepts and analysis to the education of human beings is not unanimously accepted. On the other hand, it is also a fact that earnings or wages do reflect both differing amounts and kinds of education. This is especially true of teachers' earnings in that they are paid not only on the basis of experience but also on the basis of the number of years of training. Moreover, they are seldom paid, as individuals, on the basis of personality factors such as ability and dynamism.

As for the limitations of the data, they are neither greater nor lesser than those associated with similar studies. As Hansen observes, "... in most studies the available data prove to be somewhat unlike those that we require ..." (4, p. 130).

Finally, since the study used costs and benefits aggregated as averages, the findings have only limited applicability for individual tradesmen and individual school jurisdictions. Nonetheless, the findings should be of value for purposes of comparison with alternative vocational education teacher programs in the same institution or with similar routes through other institutions of equal status.

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CHAPTER IV

THE RESEARCH DATA

I. INTRODUCTION

In order to estimate and project the cost-benefit flows associated with the forty-two problems in the study, it was necessary to compile average student costs data, including earnings foregone for the four trades occupations; average negative costs data, including bursaries, subsistence allowances, and remission of tuition fees; and the average earnings of vocational education teachers, academic teachers, and engineers. With the exception of the data on the earnings of engineers, the cost-benefit data were limited to the Alberta context for the base year of the study, 1968.

The nature and sources of the cost-benefit data are described in the following sections. In general, the data were aggregated to the level of averages and their principal sources, with a few exceptions, were official documents of various kinds.

The final section of the chapter presents a description of the procedures used for processing the data and deriving the marginal lifetime earnings, net present values, and internal rates of return quantities.

II. PRIVATE COSTS DATA

There were three components in the private student costs estimates: the direct costs, the indirect costs, and the negative costs. Inclusion of negative costs was necessitated by the existence of local and federal financial assistance for the first year of the Route I Program. A summary of the costs for each of the forty-two problems is contained in Appendix G of this study.

The Direct Costs

The sub-components of the average per student direct costs were: tuition fees, registration fees, student activities fees, and other academic costs. Data on the first three sub-components were obtained from the Faculty of Education Calender, 1968-69 (University of Alberta) for both education and engineering students. The other academic costs data were obtained from the Post-Secondary Student Population Survey, 1968-69 (Dominion Bureau of Statistics). In this case it was necessary to compute the averages, since only the frequency distributions for students in the two faculties were provided.

The average per student direct costs for education students are presented in Table III. The total average direct costs for education students in 1968-69 were \$591.

The average per student direct costs for engineering students are presented in Table IV. The total average direct

TABLE III

AVERAGE PER STUDENT COSTS, EXCLUSIVE OF EARNINGS FOREGONE,
FACULTY OF EDUCATION, UNIVERSITY OF ALBERTA, 1968

(1) Tuition Fees	(2) Registration Fees	(3) Student Fees	(4) Other Academic Costs	(5) Total
\$ 400	\$ 10	\$ 28	\$ 153	\$ 591

Sources: Faculty of Education Calender, 1968-69, University of Alberta, Edmonton, Alberta.

Post-Secondary Student Population Survey, 1968-69.
Dominion Bureau of Statistics, Education Division,
Research Section, September, 1969.

TABLE IV

AVERAGE PER STUDENT COSTS, EXCLUSIVE OF EARNINGS FOREGONE,
FACULTY OF ENGINEERING, UNIVERSITY OF ALBERTA, 1968

(1) Tuition Fees	(2) Registration Fees	(3) Student Fees	(4) Other Academic Costs	(5) Total
\$ 500	\$ 10	\$ 36	\$ 159	\$ 705

Sources: Faculty of Education Calender, 1968-69, University of Alberta, Edmonton, Alberta.

Post-Secondary Student Population Survey, 1968-69,
Dominion Bureau of Statistics, Education Division,
Research Section, September, 1969.

costs for engineering students in 1968-69 were \$705.

The Indirect Costs

The indirect costs of the educational programs were estimated on the basis of the average earnings foregone by the tradesmen during the period or periods of training. The average earnings foregone were thus viewed as opportunity costs of the students' time as a result of the decision to obtain further education (1, p. 787).

A certain amount of controversy surrounds the use of the opportunity cost concept in estimating the total private costs of education. In one view, costs of this kind ought to be excluded entirely. Vaizey (5) is an exponent of this position. He argues, on one hand, that much of the time spent in school is due to compulsory attendance, and, therefore, the person could not be earning anything, and on the other, that the notion of earnings foregone "opens the gates to a flood of approximations ..." (5, p. 594), that would upset the proper maintenance of the national accounts.

The opposite view, held by Schultz (2) and Bowman (1), suggests that students at the secondary levels and beyond may well be earning enough for their own maintenance were they not in school. Since they are in school, some accounting ought to be made of the earnings which they forego by this choice.

Despite the controversy, it has become common practice

in rate of return studies for earnings foregone to be included in the estimation of both private and social costs (4, p. 17). In this study, average earnings foregone data were obtained for automotive mechanics, construction electricians, senior stenographers, and beauticians in accordance with the typology (supra, p. 60). The average earnings of the first three trades occupations were obtained from the Twelfth Annual Report, Alberta Salary and Wage Rate Survey, August, 1968 (Alberta Bureau of Statistics). This document contains the average salary and wage rates paid for 179 job classifications, by ten types and four size-groups of firms. The ranges, medians, and weighted averages are provided for each of the occupational groupings in the two principal urban centres and for Alberta as a whole.

Acquisition of average earnings data for beauticians proved to be somewhat more problematic. The Alberta Bureau of Statistics does not survey this group and the beauticians' association does not keep any records of either wage scales or wages paid. The earnings data used were obtained by means of interviews with two independent sources: Miss M. Slack, Canada Manpower Centre, Edmonton (Appendix B); and Mrs. E. Freeman, beauty shop owner and an examiner for the Alberta Apprenticeship Board. Both made estimates of the going rates for female beauticians with five years of experience for the base year, 1968. Miss Slack's estimates were based on a survey of job offers received by her office, while Mrs.

Freeman's were based on her personal experience in the hair styling business.

Automotive mechanics. The wage earnings data of two classifications of automotive mechanics are outlined in the Twelfth Annual Report; one classification is based on dollars per month, the other on dollars per hour. The monthly rated category was selected as a basis for estimating the annual earnings foregone of automotive mechanics. The reason for this choice is that the hours of work per week may vary from forty to forty-four and beyond, thus making it difficult to determine an accurate figure for the annual earnings. The figure used as an estimate of earnings foregone per year by automotive mechanics was \$6,288, as derived from the weighted average in Table V.

TABLE V

WAGE RATE, MONTHLY, AUTOMOTIVE MECHANIC, JOURNEYMAN
CERTIFICATION, ALBERTA, AUGUST, 1968

Range	Median	Weighted Average
\$400 - \$576	\$ 520	\$ 524

Construction electricians. The Twelfth Annual Report contains earnings data for three classifications of construction electricians. Two of the classifications are based on hourly rates, while one is based on monthly rates. The earnings data presented in the monthly rated category were used in the study for the reason noted above in reference to automotive mechanics. The figure used as an estimate of earnings foregone per year by construction electricians was \$7,092, as derived from the weighted average in Table VI.

TABLE VI

WAGE RATE, MONTHLY, CONSTRUCTION ELECTRICIAN, JOURNEYMAN
CERTIFICATION, ALBERTA, AUGUST, 1968

Range	Median	Weighted Average
\$534 - 705	\$ 570	\$ 591

Senior stenographers. The job descriptions of eighteen clerical and related office occupations are presented in the Twelfth Annual Review. The problem became one of selecting a job classification which would meet the specifications of both the entrance requirements to the Route I Program and the delimitations of the research. That is to say, the category would have to be composed of females who possess sufficient training and experience and

who perform non-supervisory functions. The senior stenographer category met these criteria quite well. It is a middle range category between junior stenographer at one extreme and private secretary at the other. The figure used as an estimate of earnings foregone per year by senior stenographers was \$4,164, as derived from the weighted average in Table VII.

TABLE VII

WAGE RATE, MONTHLY, SENIOR STENOGRAPHER, NON-DESIGNATED
TRADE, ALBERTA, AUGUST, 1968

Range	Median	Weighted Average
\$300 - 400	\$ 345	\$ 347

Beauticians.¹ The earnings of beauticians with the status of employee are usually determined by two factors: basic weekly rate plus commission rate. The general practice is for the basic rate paid to be fairly near the provincial minimum wage rates. The commission rate may vary from a low of 10 per cent to a high of 30 per cent of the receipts credited to a particular employee. If the commission rate is high, then the basic guaranteed weekly

¹Information from interview with Mrs. E. Freeman, Examiner, Alberta Apprenticeship Board.

wage will be set as close as possible to the provincial minimum wage rate. The commission factor is emphasized so that the employees will develop a pool of regular clients. The average basic rate and average commission earnings for beauticians with five years of training are presented in Table VIII. The figure used as an estimate of earnings foregone per year by beauticians was \$4,940.

TABLE VIII

WAGE RATE, WEEKLY, BEAUTICIANS, DESIGNATED TRADE, FIVE YEARS EXPERIENCE, ALBERTA, 1968

Average Basic Rate	Average Commission Earnings	Total
\$75.00	\$20.00	\$ 95.00

Negative Costs

As already noted (supra, pp. 14-15), one of the significant aspects of this study was the inclusion of the negative cost factor in assessing the monetary benefits of vocational education teacher training. The negative cost components, including subsistence allowances, bursaries, and remission of tuition fees, were viewed as "earnings" which reduce the effects of earnings foregone (3, p. 23). They were included for two reasons. Firstly, they are not only available to participants in the first year of the Route I Program, but

they are also a necessity (Appendix B). In other words, it is unlikely that an applicant would be admitted to the first year without first accepting financial assistance. Secondly, the financial assistance available is of such a magnitude that it can hardly be ignored. Indeed, it was found in some instances to exceed both the direct and indirect costs to the student.

Subsistence allowances. The subsistence allowances available to first year vocational education teacher trainees under the Occupational Training for Adults Program are presented in Table IX. The specific allowance assigned to the applicant is determined by two factors: location of family residence, and number of dependents (as defined for income tax purposes). While eight allowance categories result from the combination of the two factors, as outlined in Table IX, only two categories were used in the study: single - at home; and three dependents - at home. In each case the average annual subsistence allowance was obtained by multiplying the weekly rate by 31, since that is the average number of weeks in the academic year for which allowances are paid.² Thus, the figure used as an estimate of the average annual subsistence allowance for the single - at home category was \$1,147; while that used for the three dependents - at home category was \$2,263.

²From interview with Mrs. M.W. Hunting, Program Coordinator, Canada Manpower Centre, Edmonton.

TABLE IX

SCHEDULE, CANADA MANPOWER TRAINING ALLOWANCES,
OCCUPATIONAL TRAINING FOR ADULTS PROGRAM,
EFFECTIVE JULY 1, 1968

	<u>At Home</u>	<u>Away from Home</u>
Single	\$37.00 per week	\$58.00 per week
1 Dependent	54.00 per week	75.00 per week
2 Dependents	64.00 per week	85.00 per week
3 or more Dependents	73.00 per week	94.00 per week

Source: Appendix B.

Tuition fees. Provisions are also made under the aegis of the Occupational Training for Adults Program for the payment of tuition fees on behalf of the first year teacher trainees (Appendix B). For the academic year 1968-69, the tuition fees levied by the Faculty of Education, University of Alberta, were \$400. This amount was used in the study as one of the components of the negative costs to participants in the first year of the Route I Program.

Bursaries. The third kind of subsidy available to first year students in the Route I Program is in the form of a bursary. This assistance is obtained from local school jurisdictions and may be in the amount of either \$1,800 or \$3,000. The former applies to trainees without dependents, while the latter to those with dependents (Appendix B). Although the bursaries and subsistence allowances are technically independent of one another, it is common practice

for the teacher trainees to receive both. Consequently, in the study, the \$1,800 figure was added to the subsistence allowance for the single - at home category, and the \$3,000 figure was added to the subsistence allowance for the three dependents - at home category. The total negative costs or "earnings" for the first year of the Route I Program were \$3,347 for the former, and \$5,663 for the latter.

III. PRIVATE BENEFITS DATA

Rate of return studies assume that additional education results in additional earnings. These are the private monetary benefits. The data for estimating the private monetary benefits associated with the problems of this study were derived from three sources: the average potential earnings of vocational education teachers in Alberta, the average potential earnings of academic teachers in Alberta, and the average salaries paid to engineers in Ontario, British Columbia, and Alberta. In all three cases the data were for the year 1968. The procedures used to aggregate the data, as well as the results obtained, are described in the following sub-sections.

Vocational Education Teachers' Salaries

The average potential earnings of vocational education teachers were obtained by the construction of an average salary scale. The salary data needed for the construction of

this scale were compiled from the twenty-seven collective agreements which made special provision for the salary placement of vocational education teachers. The salary minima and experience increments contained in the salary clauses of the twenty-seven collective agreements were summed and averaged. The process was limited to the two, three, and four 'years of training' columns since vocational education teachers, by definition, cannot have less than two years of teachers training and, while they can go beyond four years without changing programs, very few do so.³ The average salary scale is presented in Table X.

Analysis of the special salary placement clauses disclosed that all of the school jurisdictions made some provision for recognition of the past trades experience of vocational education teachers. However, the number of years recognized and the methods of calculation varied considerably from school system to school system (Appendix D). Although in some cases the matter was left to the discretion of the school board, the common practice was to set a maximum on the number of years of past trades experience recognized for salary purposes. The past experience maximums ranged from a low of four years to a high of eight years with six years as the modal category.

³Information from interview with Dr. H.R. Ziel, Department of Industrial and Vocational Education, University of Alberta.

TABLE X

AVERAGE SALARY SCALE, VOCATIONAL EDUCATION TEACHERS,
ALBERTA, 1968-69

Years of Teaching Experience	Years of Teacher Training		
	Two	Three	Four
0	\$ 4,710	\$ 5,460	\$ 6,641
1	5,011	5,773	7,054
2	5,312	6,091	7,464
3	5,614	6,410	7,867
4	5,906	6,727	8,287
5	6,278*	7,036*	8,690*
6	6,497**	7,337**	9,100**
7	6,775	7,636	9,510
8	7,046	7,936	9,921
9	7,292	8,224	10,322
10	7,441	8,464	10,721
11			10,891
12			10,947

* Initial placement for designated trades.

** Initial placement for non-designated trades.

Source: Aggregated from the collective agreements of 27 districts, divisions, and counties with special provisions for vocational education teachers, Alberta, 1968-69.

It was necessary to determine the maximum experience criterion in order to establish the initial salary placement of the vocational education teachers from the four trades occupations considered in the study. The five years of trades experience required of designated trades were given full recognition, while only six of the nine years required of non-designated trades were recognized. On this basis, the average earnings streams of teachers in automotive mechanics, electricity, and beauty culture were projected from the fifth step of the average salary scale, and the average earnings streams of business education teachers were projected from the sixth step.

Academic Teachers' Salaries

The data needed for projecting the average potential earnings of academic teachers were also obtained by calculating an average salary scale. In this case, however, the salary data from 125 collective agreements were summed and averaged. The average salary scale for academic teachers is presented in Table XI.

The study considered three years of academic teacher training as an alternative investment and, consequently, only the salary data from the third column of Table XI were used. Since teachers with trades occupations backgrounds do not receive any credit for past experience, the earnings streams were projected from the minimum average salary for

TABLE XI

AVERAGES OF SALARY SCALES FOR TEACHERS IN ALBERTA

Years of Teaching Experience	Years of Teacher Training			
	One	Two	Three	Four
0	\$ 4,171	\$ 4,752	\$ 5,486*	\$ 6,638
1	4,383	5,055	5,811	7,050
2	4,608	5,350	6,131	7,472
3	4,868	5,650	6,451	7,870
4	5,155	5,948	6,768	8,278
5	5,423	6,241	7,080	8,678
6	5,687	6,522	7,382	9,077
7	5,930	6,795	7,683	9,476
8	6,138	7,059	7,978	9,870
9	6,270	7,284	8,255	10,260
10	6,377	7,434	8,490	10,648
11			8,493	10,733
12				10,765

* Initial placement

Source: Calculated from Alberta Teachers' Association,
Summary of Collective Agreements for 1968-69.

three years of training.

Engineers' Salaries

The study investigated a four year program in engineering training as an investment alternative for the two male occupations, automotive mechanic and construction electrician. The data for projecting the earnings streams of engineers were compiled from the Engineers' Joint Survey, Report '68 on Salaries. The Joint Survey covers salaries paid to professional engineers in Ontario, British Columbia, and Alberta in six job classifications. The frequency distributions of the first three classifications were used to derive the average salaries paid since they were non-supervisory in nature. Hence, the equivalence with teacher functions and salaries was maintained. The average annual salaries paid to engineers in categories A, B, and C are presented in Table XII.

As in the case of academic teaching, tradesmen who decide to become engineers do not receive recognition of past working experience for salary purposes. Consequently, the earnings streams for engineers were projected from the average salary for the first year.

TABLE XII

AVERAGE ANNUAL SALARY LEVELS, ENGINEERS, CATEGORIES A,
B, AND C, NON-SUPERVISORY PERSONNEL, ONTARIO, BRITISH
COLUMBIA, AND ALBERTA, 1968

Year	Salary	Year	Salary
1	\$ 7,827*	7	\$ 10,157
2	8,104	8	10,447
3	8,671	9	10,506
4	9,114	10	10,666
5	9,621	11	10,677
6	9,819	12	10,789

* Initial placement

Source: Engineers Joint Survey, Report '68 on Salaries,
The Director, Special Services, Association of
Professional Engineers of Ontario, 236 Avenue
Road, Toronto 5, Ontario.

IV. PROCESSING THE COST-BENEFIT DATA

There were two stages in the processing of the cost-benefit data compiled for the study: the manual stage and the computer stage. The objective of the first stage was to obtain the net earnings streams associated with the forty-two cost-benefit problems developed from the six sub-problems of the study. The net earnings streams, in turn, were used in the second stage to obtain statements of marginal lifetime earnings, net present values, and internal rates of return. The steps within each stage are described in the following sub-sections.

Manual Processing of the Data

The first step in the manual processing of the data required the subdividing of the forty-two cost-benefit problems among the four occupational types. The dimensions of each occupational type, as explained above, were determined by occupational background, sex, and minimum age of entry to the Route I Program. Ten cost-benefit problems, focusing on the age, years of training, alternative university programs, and successive decisions variables, were assigned to each of the four occupational types. An eleventh problem, the engineering training alternative, was assigned to each of the two male occupations.

The next step in the process involved the estimation and projection of the cost flows and benefit flows over the predetermined earnings periods associated with each problem within the four occupational types. The differences between the costs per period and the benefits per period were then determined, resulting in the marginal benefits or net earnings streams for each problem. The net earnings streams data were then transferred to IBM cards for computer processing.

Computer Processing of the Data

Two Fortran programs for the IBM 360/67 computer were used to process the net earnings streams data. The first program, written by C. Prokop, University of Alberta,

produced the additional lifetime earnings, the net present values at four selected discount rates (4 %, 6 %, 8 %, and 10 %), and the internal rates of return calculations.

Since this program is limited to internal rate of return solutions within the range of 0 % to 50 %, it was necessary to re-process the data of seven problems to find internal rates of return that were greater than 50 per cent. A program developed by C. Morgan, University of Alberta, was used for this purpose.

The internal rates of return for two problems were found to be infinite in that there were no costs to the student for the period of training. In both cases the negative costs, through subsidization, were greater than the direct costs and earnings foregone combined. An analysis of the findings in terms of the three evaluative methods is conducted in the following chapter.

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CHAPTER V

THE PRIVATE MONETARY RETURNS

I. INTRODUCTION

The principal motivating purpose of this investigation was to evaluate vocational education teacher training in Alberta as an investment from the private investor's point of view. In order to make the basis of evaluation as broad as possible, it was considered desirable to calculate the monetary returns not only to the vocational education teacher training program, but also to alternative university programs.

In all cases, the calculations were made within the constraints imposed by the requirements for admission to the Route I Program, Faculty of Education, University of Alberta. The major constraints were: matriculation standing, trades training, and trades experience. The combining of these three factors led to the establishment of the minimum ages of entry for four selected trades occupations: automotive mechanics, construction electricians, senior stenographers, and beauticians. Having established the minimum ages of entry, it was possible to determine the maximum remaining earnings periods for the potential participants in each variation of the university programs.

Three methods were used to calculate the monetary

returns to vocational education teacher training, academic teacher training, and engineering training. The first method required the estimation of the average costs and benefits related to the various programs and their projection over the remaining earnings periods to age sixty-five. Summation of the cost-benefit differences for each period to the end of the total number of periods resulted in a statement of the additional or marginal lifetime earnings.

The second calculative method introduced the use of compound discount rates at the 4 per cent, 6 per cent, 8 per cent, and 10 per cent levels. The additional lifetime earnings quantities were discounted to the investment decision point using the four discount rates. The quantitative statements obtained in this manner constituted the net present values of the additional lifetime earnings associated with each investment project.

The net present value statement obtained by discounting at 8 per cent was used as the minimum acceptable rate of return for the purpose of investment evaluation in this study. The average annual interest rate payable on Canada Savings Bonds was the external criterion for the selection of the 8 per cent rate.

The third calculative method, the internal rate of return, resulted in statements of the discount rates at which the costs and benefits of the investment projects would become equal or, stated in another way, the discount

rates at which the net present values of the projects would be reduced to zero. In this case as well, 8 per cent was considered to be the minimum acceptable rate of return in assessing the educational investment.

The opinions of economists vary somewhat as to the relative utility of the outputs of the calculative procedures. Hansen, for example, argues that the internal rate of return measure is better than either additional lifetime earnings or the net present value for appraising the monetary returns to education at the private decision level (2, p. 139).

Stager, on the other hand, absorbs the additional lifetime earnings approach into the net present value approach by means of the 0 per cent rate of discount notion. Furthermore, he opts for the net present value measure over the internal rate of return measure. He states his position in this manner:

The internal rate of return is least useful because it is more difficult to compute and meaningful rates may not always be found. The net present value is most appropriate for private decisions since only one educational decision can be taken in a lifetime, or certainly at any one time; the maximand is therefore the absolute net gain rather than the rate of return (5, p. 201).

Schultz adopts a third position on the issue. He maintains, vis-a-vis present value estimates and internal rate estimates, that "... each has its advantage" (3, p. 307). Consequently, it seems desirable, wherever possible, to use the advantages of both measures in evaluating the returns to

educational programs at the private decision level (3, p. 307).

As outlined above, this study used procedures to obtain net present value, internal rate of return, and additional lifetime earnings measures in order to evaluate the educational investment projects. Each measure made its own particular contribution to the evaluation process. Taken together, they provided a composite view of the investment project both per se and in relation to the alternatives. The net present value measure indicated the absolute gain to be made on the investment, while the internal rate of return measure provided a basis for ranking the monetary value of the projects. Finally, the additional lifetime earnings measure provided a lump sum view of the investment without regard to the time value of money.

The twofold purpose of this chapter is to present and to analyze the results obtained in the investigation. The results are summarized and presented in Tables XIII through XXVIII. Tables XIII to XXIV inclusive, present the results for the four trades occupations types from the point of view of the first investment decision; while Tables XXV, XXVI and XXVII present the results for vocational education teachers from the four trades backgrounds on the bases of the second and the third investment decisions.

II. WITHIN TYPES RESULTS AND ANALYSIS:

FIRST INVESTMENT DECISION

The characteristics of the four trades occupations types were described in Chapter II. To review, the types were determined by a number of factors derived from the Route I Program admission requirements and the actual enrollments for the academic year 1968-69. The significant factors were: (1) matriculation standing; (2) trades training (designated or non-designated); (3) trades experience (five years or nine years); and (4) sex. The minimum ages of entry and maximum remaining earnings years were derived from the first three factors for the two male occupations (automotive mechanics and construction electricians) and the two female occupations (senior stenographers and beauticians).

The hypothetical investors within each trades type were conceptualized as making an initial educational investment choice from among a set of options. The options were composed of: (a) one or two or three years of vocational education teacher training; (b) three years of academic teacher training; and (c) four years of engineering training, for the two male trades occupations.

In order to account for the influence of negative costs (subsidies) in the first year of the vocational education teacher training options, the hypothetical investors were viewed as being either 'single' or family heads 'with

three dependents'. It was thought probable that the first condition would apply generally to the female trades types, while the latter condition would apply generally to the male trades types.

As a supplementary matter of interest, estimates of the monetary returns to the first year of the vocational education teacher training program were obtained without including the negative costs factor. While this was not considered to be a real option, in the light of the Route I Program admission policies, it was felt to be of sufficient significance, for purposes of comparison, to warrant investigation.

The negative costs factor was not included in the estimates of the monetary returns for the other program options since it was not applicable.

Automotive Mechanics

The specific characteristics of the automotive mechanics' category in the typology were: male, designated trade, senior matriculation, four years of trades training, and five years of trades experience. The minimum age of entry to the Route I Program was established as twenty-seven years and the maximum remaining earnings years to age sixty-five as thirty-eight.

The study estimated the private monetary returns to the various program options on the bases of program costs

and average earnings of automotive mechanics as viewed from the initial decision points at ages twenty-seven, thirty-two, and thirty-seven. The private monetary returns estimates expressed in terms of additional lifetime earnings, net present values, and internal rates of return are presented in Tables XIII, XIV, and XV.

Decision at age twenty-seven. Table XIII presents the private monetary returns to investment in vocational education teacher training, academic teacher training, and engineering training for automotive mechanics as viewed at age twenty-seven.

Examination of the results reveals that the monetary returns to investment in vocational education teacher training are well above the 8 per cent minimum acceptable rate. Even with the effects of subsidization removed from the first year of the Route I Program, the internal rate of return is 12.0 per cent.

At the 8 per cent discount rate, the net present value of the three year Route I Program is three times greater than that for one year in the 'single' category; and nearly three times as great in the 'three dependents' category. A similar relationship occurs in both cases in terms of the additional lifetime earnings.

While both the academic teacher training option and the engineering training option have positive internal rates

TABLE XIII

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 27,
MALES, AUTOMOTIVE MECHANICS, ALBERTA, 1968
(38 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 %	6 %	8 %	10 %	
		(2)	(3)	(4)	(5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 36,212	\$15,284	\$10,319	\$ 7,072	\$ 4,871	21.6
Two	64,174	25,156	15,996	10,063	6,091	16.0
Three	138,701	55,803	36,441	23,949	15,622	19.0
<u>Route I - Three dependents - with subsidy</u>						
One	38,528	17,511	12,504	9,216	6,977	50.0
Two	66,490	27,382	18,181	12,207	8,196	20.4
Three	141,017	58,030	38,626	26,093	17,728	22.0
<u>Route I - Without subsidy</u>						
One	32,465	11,682	6,784	3,603	1,465	12.0
<u>Academic teacher training option</u>						
Three	40,630	5,308	-2,279	-6,836	-9,580	5.3
<u>Engineering training option</u>						
Four	112,092	35,725	18,511	7,744	843	10.3

of return, 5.3 per cent and 10.3 per cent, respectively, neither is as economically attractive as the three year program in vocational education. Indeed, even the evidently high additional lifetime earnings attributable to engineering training, when discounted at 8 per cent, results in a net present value of only \$7,744 as compared to either \$23,949 (single) or \$26,093 (three dependents) for three years in the Route I Program.

Decision at age thirty-two. The private monetary returns to investment in vocational education teacher training, academic teacher training, and engineering training for automotive mechanics as viewed at age thirty-two are presented in Table XIV.

Analysis of the results provided in Table XIV indicates that the internal rates of return to investment in vocational education teacher training are substantially the same as those presented in Table XIII. There was, however, a slight decline in the range of the net present value measures associated with the various Route I Program investment projects. At the 8 per cent discount level, the net present values of the three year program, both for the 'single' and the 'three dependents' categories, declined by approximately \$1,500, while the one year program 'without subsidy' dropped from \$3,603 (Table XIII) to \$3,239. The latter project, with additional lifetime earnings of

TABLE XIV

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 32,
MALES, AUTOMOTIVE MECHANICS, ALBERTA, 1968
(33 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 % (2)	6 % (3)	8 % (4)	10 % (5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 30,447	\$13,877	\$ 9,609	\$ 6,709	\$ 4,683	21.6
Two	53,294	22,500	14,656	9,378	5,736	15.9
Three	115,406	50,118	33,572	22,481	14,862	19.0
<u>Route I - Three dependents - with subsidy</u>						
One	32,763	16,104	11,794	8,853	6,788	50.0
Two	55,610	24,727	16,841	11,522	7,841	20.4
Three	117,722	52,345	35,757	24,625	16,967	22.0
<u>Route I - Without subsidy</u>						
One	26,700	10,275	6,071	3,239	1,277	11.8
<u>Academic teacher training option</u>						
Three	29,605	2,617	-3,647	-7,531	-9,940	4.7
<u>Engineering Training option</u>						
Four	89,587	30,232	15,740	6,327	108	10.0

\$26,700 and an internal rate of return of 11.8 per cent, could still be considered a worthwhile investment at age thirty-two.

The three year academic teacher training option, on the other hand, has a higher additional lifetime earnings rating than the one year Route I Program 'without subsidy', but its net present value at 8 per cent is a negative quantity and its internal rate of return is only 4.7 per cent. In brief, the costs inherent in this project appear to be prohibitive in terms of investment possibilities.

The four year engineering training option still remains attractive at age thirty-two, but no more so than investment in the three year program for the degree of Bachelor of Education in Vocational Education.

Decision at age thirty-seven. Table XV presents the private monetary returns to investment in vocational education teacher training, academic teacher training, and engineering training for automotive mechanics as viewed at age thirty-seven.

Again, there is little appreciable difference in the internal rates of return measures for the vocational education investment projects as compared to those in Tables XIII and XIV. In all cases, including the one year Route I Program 'without subsidy', the internal rates are well above the 8 per cent minimum acceptable rate of return.

TABLE XV

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 37,
MALES, AUTOMOTIVE MECHANICS, ALBERTA, 1968
(28 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 % (2)	6 % (3)	8 % (4)	10 % (5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 24,682	\$12,166	\$ 8,659	\$ 6,175	\$ 4,380	21.5
Two	42,414	19,270	12,863	8,370	5,164	15.7
Three	92,111	43,201	29,733	20,325	13,637	18.8
<u>Route I - Three dependents - with subsidy</u>						
One	26,998	14,393	10,844	8,320	6,485	50.0
Two	44,730	21,497	15,048	10,515	7,269	23.3
Three	94,427	45,428	31,917	22,469	15,743	21.9
<u>Route I - Without subsidy</u>						
One	20,935	8,563	5,124	2,706	974	11.5
<u>Academic teacher training option</u>						
Three	18,580	-656	-5,464	-8,551	-10,519	3.8
<u>Engineering training option</u>						
Four	67,082	23,550	12,031	4,244	-1,074	9.5

While the net present values at the four discount rates are somewhat lower than those at ages twenty-seven and thirty-two, they are still high enough to make all of the investment alternatives economically feasible. In fact, the one year Route I Program 'without subsidy', in cost-benefit terms, is a sound investment.

The low internal rate of return and the negative present values for the three year academic teacher training option indicate that it is not a desirable investment project for automotive mechanics at age thirty-seven.

The four year engineering training option may still be considered as a worthwhile alternative to vocational education teacher training, even though the additional lifetime earnings and the net present values are markedly lower than those for the three year Route I Program.

Construction Electricians

The specific characteristics of the construction electricians' category in the typology were: male, designated trade, senior matriculation, four years of trades training, and five years of trades experience. The minimum age of entry to the Route I Program was established as twenty-seven years and the maximum remaining earnings years to age sixty-five as thirty-eight.

The study estimated the private monetary returns to the various program options on the bases of program costs

and the average earnings of construction electricians as viewed from the initial decision points at ages twenty-seven, thirty-two, and thirty-seven. The private monetary returns estimates expressed in terms of additional lifetime earnings, net present values, and internal rates of return are presented in Tables XVI, XVII, and XVIII.

Decision at age twenty-seven. Table XVI presents the private monetary returns to investment in vocational education teacher training, academic teacher training, and engineering training for construction electricians as viewed at age twenty-seven.

Comparison of the internal rate of return estimates for the nine investment projects indicates that only four of them exceed the minimum acceptable rate of 8 per cent. All four projects are variants of the Route I Program. The highest rates of return are associated with the degree program for both the 'single' and 'three dependents' categories, 14.1 per cent and 16.0 per cent, respectively; while the lowest rate of return (1.0 per cent) is derived from the one year Route I Program 'without subsidy'.

Two of the four positive net present value estimates at the 8 per cent discount rate are worthy of investment consideration. In both cases, they are at the degree program level for the 'single' and 'three dependents' categories.

The monetary returns measures for the three year

TABLE XVI

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 27,
MALES, CONSTRUCTION ELECTRICIANS, ALBERTA, 1968
(38 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 % (2)	6 % (3)	8 % (4)	10 % (5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 5,752	\$ -211	\$-1,547	\$-2,375	\$-2,896	3.8
Two	33,622	9,584	4,060	553	-1,733	8.4
Three	108,149	40,231	24,505	14,438	7,797	14.1
<u>Route I - Three dependents - with subsidy</u>						
One	8,078	2,025	646	-221	-728	7.4
Two	35,938	11,811	6,245	2,697	371	10.4
Three	110,465	42,458	26,690	16,582	9,903	16.0
<u>Route I - Without subsidy</u>						
One	2,005	-3,814	-5,082	-5,844	-6,302	1.0
<u>Academic teacher training option</u>						
Three	10,168	-10,210	-14,183	-16,314	-17,379	1.4
<u>Engineering training option</u>						
Four	81,440	20,088	6,522	-1,808	-7,016	7.5

academic teacher training option are considerably below standard, while those for the four year engineering training option are somewhat marginal. The additional lifetime earnings estimate of \$81,440 and the internal rate of return estimate of 7.5 per cent may indicate that the degree program in engineering is a sound investment for a twenty-seven year old construction electrician.

Decision at age thirty-two. Table XVII shows the private monetary returns to investment in vocational education teacher training, academic teacher training, and engineering training for construction electricians as viewed at age thirty-two.

The internal rates of return estimates for the nine investment projects viewed at age thirty-two have the same ranking as those viewed at age twenty-seven. In the case of the results shown in Table XVII, however, the rates of return to the one year Route I Program 'without subsidy' and the three year teacher training program are approaching the zero point.

On the basis of the net present value estimates at 8 per cent, the degree program in vocational education still appears as a feasible investment for construction electricians. On the other hand, the same measure for the four year engineering option appears as a negative quantity and, although the additional lifetime earnings estimate is \$62,955,

TABLE XVII

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 32,
MALES, CONSTRUCTION ELECTRICIANS, ALBERTA, 1968
(33 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 % (2)	6 % (3)	8 % (4)	10 % (5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 4,007	\$ -637	\$ -1,762	\$ -2,485	\$ -2,953	3.2
Two	26,762	7,909	3,215	120	-1,957	8.1
Three	88,874	35,527	22,131	13,224	7,168	14.0
<u>Route I - Three dependents - with subsidy</u>						
One	6,333	1,599	431	-331	-838	7.0
Two	29,078	10,136	5,400	2,265	147	10.2
Three	91,190	37,754	24,316	15,368	9,273	15.9
<u>Route I - Without subsidy</u>						
One	260	-4,240	-5,297	-5,954	-6,359	0.1
<u>Academic teacher training option</u>						
Three	3,163	-11,919	-15,046	-16,755	-17,608	0.5
<u>Engineering training option</u>						
Four	62,955	15,577	4,246	-2,972	-7,620	6.3

the investment may be of questionable value, since the benefits to be received are in the distant future.

Decision at age thirty-seven. The private monetary returns to investment in vocational education teacher training, academic teacher training, and engineering training for construction electricians as viewed at age thirty-seven are presented in Table XVIII.

Again, the internal rates of return for the degree program in vocational education are the highest for the nine investment projects, both from the point of view of the single person and that of the person with three dependents. Moreover, the additional lifetime earnings and net present values measures in the same two categories would support the investment decision.

The returns estimates for two of the projects -- the one year Route I Program 'without subsidy' and the three year academic teacher training option -- register negative measures for the additional lifetime earnings and the net present values and, consequently, zero internal rates of return. These two projects were the only cases in the study in which the costs were found to exceed the benefits.

Senior Stenographers

The specific characteristics of the senior stenographers' category in the typology were: female, non-designated trade, senior matriculation, one year of trades training, and

TABLE XVIII

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 37,
MALES, CONSTRUCTION ELECTRICIANS, ALBERTA, 1968
(28 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 % (2)	6 % (3)	8 % (4)	10 % (5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 2,262	\$-1,155	\$-2,050	\$-2,646	\$-3,044	2.2
Two	19,902	5,873	2,084	-514	-2,318	7.5
Three	69,599	29,804	18,954	11,440	6,155	13.7
<u>Route I - Three dependents - with subsidy</u>						
One	4,588	1,081	144	-493	-930	6.4
Two	22,218	8,100	4,269	1,630	-212	9.7
Three	71,915	32,031	21,139	13,584	8,260	15.6
<u>Route I - Without subsidy</u>						
One	-1,485	-4,785	-5,585	-6,116	-6,451	0.0
<u>Academic teacher training option</u>						
Three	-3,842	-13,999	-16,201	-17,404	-17,976	0.0
<u>Engineering training option</u>						
Four	44,470	10,888	1,199	-4,683	-8,591	5.0

nine years of trades experience. The minimum age of entry to the Route I Program was determined as twenty-eight years and the maximum remaining earnings years to age sixty-five as thirty-seven.

The study estimated the private monetary returns to the various program options on the bases of program costs and the average earnings of senior stenographers as viewed from the initial decision points at ages twenty-eight, thirty-three, and thirty-eight. The private monetary returns estimates expressed in terms of additional lifetime earnings, net present values, and internal rates of return are presented in Tables XIX, XX, and XXI.

Decision at age twenty-eight. Table XIX presents the private monetary returns estimates to investment in vocational education teacher training and academic teacher training for senior stenographers as viewed at age twenty-eight. The engineering training option was not included in the two female trades categories.

All of the internal rates of return estimates shown in Table XIX are well above the minimum acceptable rate of 8 per cent. Indeed, for the one year Route I Program 'three dependents', the internal rate of return could be considered as infinite, in that there are no costs to participation. The reason for this result is that the financial assistance available exceeds both the direct costs to and the earnings

TABLE XIX

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 28,
FEMALES, SR. STENOGRAPHERS, ALBERTA, 1968
(37 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 %	6 %	8 %	10 %	
		(2)	(3)	(4)	(5)	
<u>Route I - Single - with subsidy</u>						
One	\$114,810	\$56,685	\$42,426	\$32,890	\$26,268	99.0+
Two	142,014	66,504	48,136	35,941	27,551	56.0
Three	214,887	97,178	68,803	50,109	37,365	42.1
<u>Route I - Three dependents - with subsidy</u>						
One	117,126	58,912	44,611	35,034	28,373	∞
Two	144,330	68,731	50,321	38,086	29,656	99.0+
Three	217,203	99,405	70,988	52,253	39,471	61.0
<u>Route I - Without subsidy</u>						
One	111,063	53,082	38,892	29,420	22,861	56.0
<u>Academic teacher training option</u>						
Three	117,013	45,470	28,770	18,055	10,976	16.5

foregone by the teacher trainee.

The net present value measures discounted at 8 per cent are probably better than either the internal rates of return or the additional lifetime earnings for ranking the potential investments in this case. The net present values at 8 per cent range from a low of \$18,055, for the three year academic teacher training option, to a high of \$52,253, for the three year Route I Program 'three dependents'. It is interesting to note that the net present value estimate for the one year Route I Program 'without subsidy' is greater than that for the three year academic teacher training option. Nonetheless, the latter remains an attractive investment possibility with a net present value of \$18,055.

Decision at age thirty-three. The private monetary returns estimates to investment in vocational education teacher training and academic teacher training for senior stenographers as viewed at age thirty-three are presented in Table XX.

There is no appreciable difference in the internal rates of return measures in Table XX as compared to those in Table XIX. The rates of return for the eight investment projects remain relatively high from the vantage of a thirty-three year old senior stenographer.

The additional lifetime earnings quantities are somewhat reduced, but are still greater than the amounts available

TABLE XX

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 33,
FEMALES, SR. STENOGRAPHERS, ALBERTA, 1968
(32 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 %	6 %	8 %	10 %	
		(2)	(3)	(4)	(5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 98,425	\$52,526	\$40,287	\$31,775	\$25,679	99.0+
Two	120,514	61,047	45,329	34,478	26,779	56.0
Three	180,972	88,570	64,376	47,801	36,148	42.1
<u>Route I - Three dependents - with subsidy</u>						
One	100,741	54,753	42,472	33,919	27,785	∞
Two	122,830	63,274	47,514	36,623	28,884	99.0+
Three	183,288	90,797	66,560	49,946	38,253	60.9
<u>Route I - Without subsidy</u>						
One	94,678	48,923	36,752	28,305	22,273	55.9
<u>Academic teacher training option</u>						
Three	95,368	39,976	25,945	16,582	10,199	16.4

to either of the two male categories. It is also worth noting that the additional lifetime earnings measures for the one year Route I Program 'without subsidy' and the three year academic teacher training option are nearly equal -- \$94,678 for the former and \$95,368 for the latter.

Decision at age thirty-eight. Table XXI presents the monetary returns estimates to investment in vocational education teacher training and academic teacher training for senior stenographers as viewed at age thirty-eight.

The addition of ten years to the minimum age of entry and the consequent reduction of the lifetime earnings stream does not result in any meaningful decline in the internal rates of return for the eight investment projects studied in this category. There is a slight decline in the internal rate of return measure for the three year academic teacher training option, but it is still twice as high as the minimum acceptable rate -- 16.1 per cent as compared to 8 per cent.

The net present values at the 8 per cent discount rate indicate that all of the projects are economically feasible, with the degree program in vocational education remaining well ahead of the others.

Beauticians

The specific characteristics of the beauticians' category in the typology were: female, designated trade,

TABLE XXI

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 38,
FEMALES, SR. STENOGRAPHERS, ALBERTA, 1968
(27 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 % (2)	6 % (3)	8 % (4)	10 % (5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 82,040	\$47,467	\$37,425	\$30,137	\$24,732	99.0+
Two	99,014	54,408	41,573	32,329	25,535	56.0
Three	147,057	78,097	58,450	44,411	34,186	42.1
<u>Route I - Three dependents - with subsidy</u>						
One	84,356	49,694	39,610	32,281	26,837	∞
Two	101,330	56,635	43,758	34,473	27,641	99.0+
Three	149,373	80,324	60,635	46,555	36,292	60.9
<u>Route I - Without subsidy</u>						
One	78,293	43,864	33,890	27,047	21,325	55.8
<u>Academic teacher training option</u>						
Three	73,723	33,292	22,163	14,418	8,947	16.1

senior matriculation, one year of trades training, and five years of trades experience. The minimum age of entry to the Route I Program was determined as twenty-four years and the maximum remaining earnings years to age sixty-five as forty-one.

The study estimated the private monetary returns to the various program options on the bases of program costs and the average earnings of beauticians as viewed from the initial decision points at ages twenty-four, twenty-nine, and thirty-four. The private monetary returns estimates expressed in terms of additional lifetime earnings, net present values, and internal rates of return are presented in Tables XXII, XXIII, and XXIV.

Decision at age twenty-four. The private monetary returns estimates to investment in vocational education teacher training and academic teacher training for beauticians as viewed at age twenty-four are presented in Table XXII.

The monetary returns measures obtained for the eight projects support consideration of each as a valid investment. The internal rates of return range from 12.0 per cent for the three year academic teacher program to infinity for the one year Route I Program 'three dependents'.

Ranked on the basis of net absolute gain, as determined by the net present values at 8 per cent, the best investments, in descending order, would be in the three, two,

TABLE XXII

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 24,
FEMALES, BEAUTICIANS, ALBERTA, 1968
(41 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 %	6 %	8 %	10 %	
		(2)	(3)	(4)	(5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 94,939	\$42,956	\$31,062	\$23,363	\$18,157	89.0
Two	125,970	53,467	37,038	26,496	19,445	34.7
Three	207,946	85,666	58,208	40,725	29,141	30.3
<u>Route I - Three dependents - with subsidy</u>						
One	97,255	45,183	33,247	25,508	20,263	∞
Two	128,286	55,649	39,223	28,640	21,550	55.0
Three	210,262	87,893	60,393	42,870	31,247	38.1
<u>Route I - Without subsidy</u>						
One	91,192	39,353	27,527	19,894	14,751	34.0
<u>Academic teacher training option</u>						
Three	102,513	33,637	18,760	9,600	3,775	12.0

and one year Route I Program, respectively. With the financial assistance removed, the one year Route I Program is still a good investment as measured by the internal rate of return (34.0 per cent), the net present value at 8 per cent (\$19,894) and the additional lifetime earnings (\$91,192).

Decision at age twenty-nine. The private monetary returns estimates to investment in vocational education teacher training and academic teacher training for beauticians as viewed at age twenty-nine are presented in Table XXIII.

There are no substantial differences in either the internal rates of return or the net present values measures presented in Table XXIII as compared to those in Table XXII. Except for a slight drop in the internal rate of return for the three year academic teacher training program, the other rates remain unchanged. The decline in the net present values at the 8 per cent discount rate ranges from a low of \$600 for the one year Route I Program to a high of \$1,500 for the degree program in vocational education.

In all cases, the monetary returns are large enough to make investment in any one of the eight projects an economically valid decision. However, the best investment for the twenty-nine year old beautician would be in the three year Route I Program.

TABLE XXIII

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 29,
FEMALES, BEAUTICIANS, ALBERTA, 1968
(36 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 %	6 %	8 %	10 %	
		(2)	(3)	(4)	(5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 82,434	\$40,243	\$29,769	\$22,738	\$17,850	89.0
Two	108,350	49,644	35,216	25,615	19,013	34.7
Three	177,911	79,150	55,102	39,223	28,405	30.3
<u>Route I - Three dependents - with subsidy</u>						
One	84,750	42,470	31,954	24,882	19,956	∞
Two	110,666	51,871	37,401	27,759	21,118	55.0
Three	180,227	81,377	57,287	41,368	30,510	38.1
<u>Route I - Without subsidy</u>						
One	78,687	36,640	26,234	19,269	14,444	34.0
<u>Academic teacher training option</u>						
Three	84,748	29,783	16,923	8,711	3,339	11.8

Decision at age thirty-four. Table XXIV presents the private monetary returns estimates to investment in vocational education teacher training and academic teacher training for beauticians as viewed at age thirty-four.

Examination of the results shown in Table XXIV indicates that the reduction of the lifetime earnings stream to thirty-one periods produces no meaningful changes in the internal rates of return for the eight investment projects. The net present values discounted at 8 per cent decline somewhat, but they are still more than adequate to justify investment. The same conclusion applies to the additional lifetime earnings estimates.

It seems evident that teacher training, either vocational or academic, would be a sound investment decision for a thirty-four year old beautician as classified in this study.

III. WITHIN TYPES RESULTS AND ANALYSIS:

SECOND AND THIRD DECISIONS

The private monetary returns to investment in vocational education teacher training viewed in terms of the second and third investment decisions are presented in Tables XXV, XXVI, and XXVII.

Essentially, this part of the study attempted to measure the investment value of the internal structure of the average vocational education teachers' salary scale (1968).

TABLE XXIV

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, AS VIEWED AT AGE 34,
FEMALES, BEAUTICIANS, ALBERTA, 1968
(31 periods)

Years at Univers- ity	Addi- tional Lifetime Earnings (1)	Present Value of Additional Earnings at:				Internal Rate of Return (%) (6)
		4 %	6 %	8 %	10 %	
		(2)	(3)	(4)	(5)	
<u>Route I - Single - with subsidy</u>						
One	\$ 69,929	\$36,942	\$28,039	\$21,819	\$17,357	89.0
Two	90,730	44,993	32,777	24,320	18,317	34.6
Three	147,876	71,222	50,946	37,016	27,218	30.3
<u>Route I - Three dependents - with subsidy</u>						
One	72,245	39,169	30,224	23,964	19,462	∞
Two	93,046	47,220	34,962	26,465	20,422	55.0
Three	150,192	73,449	53,130	39,161	29,608	38.1
<u>Route I - Without subsidy</u>						
One	66,182	33,339	24,504	18,350	13,950	34.0
<u>Academic teacher training option</u>						
Three	66,983	25,093	14,465	7,406	2,638	11.6

It was assumed that the potential investors had already completed the first year of the Route I Program, were certificated and, therefore, had two years of teacher training recognized for salary purposes. The second decision involved the choice of either starting to teach or remaining for the second year of the Route I Program. By the same token, the third decision was conceptualized as a choice between teaching or continuing to the completion of the Bachelor's Degree in vocational education. In both cases, the decision was assumed to occur immediately following the completion of the preceding year's course requirements.

Each year of the Route I Program completed meant that the participant's lifetime earnings stream had to be reduced by an equal amount. Consequently, the monetary returns to the second investment decision were obtained after adding one year to the minimum ages of entry of each trades type and to the ages of the potential investors at two five-year intervals thereafter. The returns to the third decision were obtained after adding two years in each case. Thus, the automotive mechanic, for example, was seen as making the second investment decision at ages twenty-eight, thirty-three, and thirty-eight, and the third investment decision at ages twenty-nine, thirty-four, and thirty-nine.

The distinction between the four trades types was not too meaningful in this part of the study, except for purposes

of establishing the ages at which the investment decisions were to be made and the initial placement on the average salary scale for vocational education teachers. The earnings foregone portion of the program costs were calculated on the basis of the levels of the average salary scale and not on the average trades earnings. Also, negative costs were not included, since no general provision exists for subsidization of the second and third years of the Route I Program. Despite this fact, many vocational education teachers do return to university for further training, thus creating annoying shortages in the high schools (1, p. 5).

Automotive Mechanics and Construction Electricians

It was possible to combine the findings for automotive mechanics and construction electricians because both are designated trades (salary placement) and have the same minimum age of entry (earnings streams). The private monetary returns estimates for the second and third decisions are presented in Table XXV.

Second decision. Analysis of the results shown in Table XXV indicates that there is very little variation in either the internal rates of return or the net present values in moving from one age level to another. The monetary benefits exceed the costs in all cases, even though the additional lifetime earnings are approximately \$10,000 less for the decision at age thirty-eight than for the decision

TABLE XXV

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, MALES, AUTO. MECHANICS
AND CONSTRUCTION ELECTRICIANS, ALBERTA, 1968 --
SECOND AND THIRD DECISIONS

Year of Univers- ity Program	Net Addi- tional Lifetime Earnings (1)	Present Value of Net Earnings at:				Internal Rate of Return (%) (6)
		4 %	6 %	8 %	10 %	
		(2)	(3)	(4)	(5)	
<u>At age: 28 (37 earnings periods)</u>						
Second	\$27,972	\$10,268	\$ 6,018	\$ 3,230	\$ 1,342	12.0
<u>At age: 33 (32 earnings periods)</u>						
Second	22,847	8,967	5,349	2,882	1,158	11.9
<u>At age: 38 (27 earnings periods)</u>						
Second	17,732	7,388	4,456	2,370	862	11.5
<u>At age: 29 (36 earnings periods)</u>						
Third	74,527	33,148	22,971	16,196	11,532	24.1
<u>At age: 34 (31 earnings periods)</u>						
Third	62,112	29,871	21,253	15,283	11,042	24.1
<u>At age: 39 (26 earnings periods)</u>						
Third	49,697	25,883	18,954	13,943	10,252	24.0

at age twenty-eight. The salary differential available as a result of completing the second year of the Route I Program thus makes investment in additional vocational education teacher training financially desirable.

Third decision. The same conclusion may be drawn from an examination of the monetary returns estimates for the third decision, that is, the movement from the second year Route I Program to the completion of the Bachelor's degree. At all three age levels, the monetary returns are significantly higher than those derived for the second decision. The increases in the additional lifetime earnings, the net present values, and the internal rates of return are the result of the higher salary differentials usually associated with four years of teacher training as compared to the three year training level.

Senior Stenographers

The private monetary returns estimates for the second and third decisions by senior stenographers are presented in Table XXVI. The results for the two female categories could not be combined for two reasons. First, they have different minimum ages of entry; twenty-four years for beauticians and twenty-eight years for senior stenographers. Second, the former is a designated trade while the latter is a non-designated trade, which means that they have slightly different initial placements on the average salary schedule

TABLE XXVI

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, FEMALES, SR.
STENOGRAPHERS, ALBERTA, 1968 --
SECOND AND THIRD DECISIONS

Years of Univer- sity Program	Net Addi- tional Lifetime Earnings (1)	Present Value of Net Earnings at:				Internal Rate of Return (%) (6)
		4 % (2)	6 % (3)	8 % (4)	10 % (5)	
<u>At age: 29 (36 earnings periods)</u>						
Second	\$27,204	\$10,211	\$ 6,052	\$ 3,295	\$ 1,411	12.2
<u>At age: 34 (31 earnings periods)</u>						
Second	22,089	8,861	5,344	2,919	1,209	12.0
<u>At age: 39 (26 earnings periods)</u>						
Second	16,974	7,219	4,397	2,367	883	11.6
<u>At age: 30 (35 earnings periods)</u>						
Third	72,873	33,177	23,221	16,525	11,875	24.6
<u>At age: 35 (30 earnings periods)</u>						
Third	60,458	29,768	21,400	15,539	11,336	24.6
<u>At age: 40 (25 earnings periods)</u>						
Third	48,043	25,622	18,963	14,092	10,467	24.5

for vocational education teachers.

Second decision. Although there is a gradual decline in the returns measures from the minimum age to the maximum age for the second investment decision, the monetary benefits are sufficiently high to warrant investment in the second year of the Route I Program. Beyond age thirty-nine, however, it would appear as though the monetary benefits would drop somewhat more rapidly.

Third decision. The decision to complete the Bachelor of Education degree in Vocational Education is clearly supported by the monetary returns shown for the third decision between ages thirty and forty. The net present values discounted at 8 per cent are \$16,525 for the minimum age and \$14,092 for the maximum age. In both cases, the net present values are four to five times greater than the net present values at the same discount rate for the second decision.

Beauticians

Table XXVII shows the private monetary returns estimates for the second and third decisions by beauticians.

Second decision. The internal rates of return and net present values measures obtained for a second investment decision by beauticians are similar to those for the other trades categories. However, the advantage of a longer earnings lifetime as a teacher appears in the additional

TABLE XXVII

PRIVATE MONETARY RETURNS TO INVESTMENT IN VOCATIONAL
EDUCATION TEACHER TRAINING, FEMALES, BEAUTICIANS,
ALBERTA, 1968 -- SECOND AND THIRD DECISIONS

Year of Univer- sity Program	Net Addi- tional Lifetime Earnings (1)	Present Value of Net earnings at:				Internal Rate of Return (%) (6)
		4 %	6 %	8 %	10 %	
		(2)	(3)	(4)	(5)	
<u>At age: 25 (40 earnings periods)</u>						
Second	\$31,031	\$10,931	\$ 6,334	\$ 3,383	\$ 1,416	12.1
<u>At age: 30 (35 earnings periods)</u>						
Second	25,912	9,776	5,773	3,106	1,278	12.0
<u>At age: 35 (30 earnings periods)</u>						
Second	20,801	8,372	5,023	2,701	1,056	11.7
<u>At age: 26 (39 earnings periods)</u>						
Third	81,976	34,827	23,786	16,596	11,732	24.1
<u>At age: 31 (34 earnings periods)</u>						
Third	69,561	31,913	22,344	15,872	11,364	24.1
<u>At age: 36 (29 earnings periods)</u>						
Third	57,146	28,369	20,413	14,808	10,770	24.1

lifetime earnings measures. Because of the age differentials, beauticians may earn, on an average, \$3,000 more than their colleagues over the length of their careers. This consideration aside, the findings would support a further investment in the Route I Program.

Third decision. Again, the monetary returns for the third investment decision are indicative of the economic value of the Bachelor's degree in vocational education. The net present values at 8 per cent discount are four to five times greater and the internal rates of return are two times greater at each age level than those for the second decision. In economic terms, teachers of beauty culture would make a reasonable choice by continuing in the Route I Program to the completion of the Bachelor of Education degree in Vocational Education.

IV. DISCUSSION OF THE RESULTS AND ANALYSIS

A close appraisal of the results reported in the preceding sections of this chapter suggests that there may be some issues which need further clarification. The more pertinent issues arise from three general sources: the evaluation methods, the utility of the findings, and the relationship of this study to others of the same kind. On this basis, then, the issues have been classified in terms of methodology, applicability, and comparability.

Methodology

The outputs of three calculative methods were used to evaluate the educational investment projects in this study: additional lifetime earnings, net present value, and internal rate of return. The outputs of the last two methods were assumed to be of greater value than the first in determining investment feasibility in that they take into account the time value of money. This feature notwithstanding, both methods have inherent limitations which are worth noting.

In the case of the net present value method, the limitation resides in the sensitivity of these measures to the discount rates used (5, p. 150). Numerous examples of the sensitivity effect appear in the net present value figures reported in this study. To illustrate, in Table XVII, the net present value for the two year Route I Program 'single' is \$3,215 when discounted at 6 per cent (Col. 3, Row 2) and only \$120 when discounted at 8 per cent (Col. 4, Row 2). Since the internal rate of return derived for the same project is 8.1 per cent (Col. 6, Row 2), it can be expected that the net present value figure will approach zero at an 8 per cent discount rate. The existence of the sensitivity effect underscores the need for a range of discount rates in calculating the net present value and also the need for calculating the internal rate of return in order to determine the upper limit of the rate.

The inherent limitation of the internal rate of return method, on the other hand, is that it is, to a marked degree, insensitive to time changes in the earnings stream. Again, a number of examples of what might be called the insensitivity effect appear in the rates of return findings reported in this study. To illustrate, in Tables XIX, XX, XXI, the internal rates of return for the three year academic teacher training option are 16.5 per cent, 16.4 per cent, and 16.1 per cent, respectively, despite the shortening of the lifetime earnings stream by ten years. The reason for this effect is that the direct costs of the educational program are recovered in the first few years of the investment.

Comparison of the internal rates of return to the four trades categories discloses a third phenomenon which appears to be peculiar to this study. On the one hand, the rates of return to female investors tend to be inverse relationship to the number of years of vocational education teacher training (see Table XXII), while, on the other, the rates of return to male investors tend to be in direct relationship (see Table XVI). In brief, as measured by the internal rate of return method, females are able to recover their relatively low costs at a lower level of training than the males, who, in turn, must pursue more years of training in order to make the investment pay.

Applicability

The four specific areas in which the findings of this study may be applicable were cited in Chapter I in connection with the significance of the study. It is intended at this point to consider one of the areas, that of theory.

If the economic theory of rational choice, as posited in the study, has any validity, then the findings should be of some relevance in the explanation and prediction of human behavior. Given profitability as the goal of economic man (4, p. 197), it should be possible to deduce, in general terms at least, the kinds of decisions which would be made by tradesmen from the four trades types in the light of the monetary returns found to be available.

Ideally, the conclusions drawn from such speculations should be compared to statistical evidence of actual behavior for the purpose of verification.

Some data exist regarding enrollments by year and trades training, and the number of Bachelor of Education in Vocational Education graduates by year, but not by sex. Unfortunately, there are no systematic, long-run data available concerning the career activities of vocational education teachers who have taken the Route I Program. Consequently, most of the extrapolations from the findings of the study remain as speculations and therefore may be considered as hypotheses for further investigation. It should be pointed

out, however, that in some cases it was possible to check the predictive judgments with knowledgeable persons associated either directly or indirectly with the Route I Program.

For purposes of clarity, the deductions from the findings have been classified on the bases of the male-female dichotomy and a threefold division of the time dimension: recruitment, training, and retention. The recruitment and training categories apply to the period of the vocational education teacher training program and the alternative programs, while the retention category applies to the post-training period or the period of career activities.

The monetary returns to investment in the Vocational Education Program, Route I, and the alternative programs for automotive mechanics and construction electricians (see Tables XIII to XVIII, inclusive) appear to support the following generalizations.

Recruitment. Assuming an adequate supply of matriculants, it is probable that:

(1) automotive mechanics and, by extension, other tradesmen from lower earnings levels would tend to enroll in the Route I Program rather than in the academic teacher training program;

(2) the Route I Program 'without subsidy' would remain attractive to tradesmen with automotives training;

(3) construction electricians and, by extension,

other tradesmen from higher earnings levels would not be attracted to the Route I Program;

(4) construction electricians would not be attracted to either the academic teacher training program or the one year Route I Program 'without subsidy';

(5) younger members of both male categories may tend toward enrollment in the engineering training program, especially if the monetary returns reported herein have been underestimated.

Training. Assuming that the tradesmen from the two male categories enroll in the Route I Program, it is probable that:

(1) they will continue to the completion of the Bachelor's degree;

(2) tradesmen with qualifications in electricity have a greater propensity to drop out of the program than have those with qualifications in automotives;

(3) a greater proportion of male enrollees would complete the first degree than would be the case for females.

Retention. Assuming that the male vocational education teachers accept teaching positions, it is probable that:

(1) those with electrical trades training would tend to leave the teaching context either by returning to industry or by taking educational administration;

(2) those with automotive trades training would tend to remain in the teaching context;

(3) those with electrical trades training would be involved in salary negotiations and 'moonlighting' to a greater extent than either their male counterparts or members of the two female groups.

The monetary returns to investment in vocational education teacher training and the three year academic teacher training option by senior stenographers and beauticians (see Tables XIX to XXIV, inclusive) appear to support the following generalizations.

Recruitment. Assuming an adequate supply of matriculants, it is probable that:

(1) members of both groups would tend to enroll in the Route I Program rather than in the academic teacher program;

(2) members of both groups would enroll in the Route I Program even if the subsidy were removed.

Training. Assuming that both senior stenographers and beauticians have enrolled in the Route I Program, it is probable that:

(1) they would continue to the completion of the first year of the program;

(2) a smaller proportion as compared to the male categories would continue to the completion of the Bachelor

of Education in Vocational Education degree.

Retention. Assuming that female vocational education teachers accept teaching positions, it is probable that:

(1) they would tend to remain in the teaching context and, if they do leave, it would be for reasons unrelated to financial returns.

Comparability

The final issue for consideration here has to do with the relationship of this study to others of the same kind in terms of the comparison of results. In general, the exact comparison of results from study to study would require that the earnings data, calculative methods, and data adjustments used be substantially similar. In the absence of one or more of these conditions, the results obtained in different studies are only relatively comparable. Of course, the greater the degree of similarity, the greater the degree of comparability.

The principal difference in this study, as compared to others of the same kind, lies in the area of data adjustments. In the first place, the private monetary returns reported herein are not adjusted for personal income taxes. In the second place, the private monetary returns to the various investment projects in the Route I Program are adjusted for negative costs. This latter reduces the effects of earnings foregone during the periods of training.

In some private rate of return studies the earnings data are adjusted for personal income taxes. This is known as the after-tax basis. In other studies, for example, those of Hansen (2) and Stager (5), the private monetary returns are obtained on both a before- and after- tax basis. Examination of the private internal rates of return reported in the Stager study indicates that the rates are from 4.5 per cent to 0.2 per cent lower on the after-tax basis than those rates obtained on the before-tax basis. This supports Hansen's observation that:

Not only will all rates of return be lower after tax, but also the relative declines in the rates will differ, given the progressivity of tax rates and the positive association between income and educational levels (2, p. 132).

The absence of the tax adjustment feature neither undermines the internal consistency of the study nor invalidates comparisons with the results of other private rate of return studies. In the latter case, comparisons can still be made with tax-adjusted returns as long as it is remembered that the rates reported in this study are somewhat higher for the various levels and kinds of education.

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CHAPTER VI

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND FURTHER RESEARCH

I. SUMMARY

The Problem

In general terms, the main problem dealt with in this study was that of evaluating the monetary returns to investment in vocational education teacher training in Alberta.

At a more specific level, the investigation was delimited in four important ways. First, the private investment perspective, as opposed to the societal, was maintained throughout the study. Second, the vocational education teacher training was restricted to that available through participation in the Vocational Education Program, Route I, Faculty of Education, University of Alberta. Third, the potential investors in vocational education teacher training were limited to four specific trades occupations backgrounds: automotive mechanics, construction electricians, senior stenographers, and beauticians. Finally, the monetary benefits were measured in terms of an average salary scale derived from the collective agreements of the twenty-seven school jurisdictions within the province that employ vocational education teachers.

The Sub-Problems

Six sub-problems, each focusing on a significant variable, were evolved from the statement of the main problem. The investigation sought answers to the questions posed in the following statement of the sub-problems:

- (1) To what extent do the estimated monetary returns vary with occupational background?
- (2) To what extent do the estimated monetary returns vary with sex?
- (3) To what extent do the monetary returns vary with age of entry to vocational education teacher training?
- (4) To what extent do the estimated monetary returns vary with the number of years of training as a vocational education teacher?
- (5) To what extent do the estimated monetary returns vary in comparison to alternative university programs?
- (6) To what extent do the estimated monetary returns vary with successive decisions to move from one level of vocational education teacher training to another?

Theoretical Basis

The theoretical basis for the study was provided by the concepts, assumptions, and operational procedures

associated with the contemporary economic view of education as an investment. In this view, private and social expenditures on the education (training) of human beings are conceptualized as investments in the formation of human capital. The extent of the human capital formed is determined by the magnitude of the potential earnings stream following upon the investment in education, in much the same way that the yield of physical capital investment is measured in terms of the consequent flow of services over time. In short, education is a good (capital) embodied in human beings which produces other goods (higher earnings) both for the individual and society.

This investor's approach to the economic effects of education assumes that the goal of student behavior lies in the maximization of profit. Furthermore, it assumes that the decision to invest is fundamentally rational. That is to say, faced with two or more alternatives, the student would choose the one which produces the greatest profit. The profitability assumption eliminates the consumption aspect of education, although some studies attempt to provide for it by dividing the costs of education among production and consumption on an a priori basis.

Related Research

A large body of research literature has emerged in the past decade or so as a result of the new-found interest

on the part of economists in the investment aspects of education. Although the initial studies were mostly by Americans and based on American data, this "revolution in economic thought" to use Bowman's phrase (1, p. 103), has spread throughout the world. As a consequence, research findings have become available for such disparate countries as Mexico, Venezuela, and Israel (2, pp. 59-63). Some of the findings of research work done in the United States (Hansen, Ashenfelter and Mooney), Great Britain (Blaug), and Canada (Dupuis, Podoluk, Stager) have been reported in this study (see Chapter II). By and large, it has been found that most kinds and levels of education pay high rates of return on investment both from the private and societal viewpoints.

The Typology

In order to conduct the research reported herein, it was necessary to develop a typology of trades occupations. The classification, based on the male-female sex and the designated-non-designated trades dichotomies, was limited to four dominant trades occupations. Dominance was determined in this instance by the enrollments in the Vocational Education Program, Route I, and by the types of courses offered in vocational high schools. The four trades occupations selected were: automotive mechanics, construction electricians, senior stenographers, and beauticians. Their minimum ages of entry to vocational education teacher training,

as determined by the admissions policy, were twenty-seven years, twenty-seven years, twenty-eight years, and twenty-four years, respectively.

Using the minimum ages of entry as the initial investment decision points, it was then possible to estimate the average costs and benefits streams to age sixty-five for the four trades types, with adjustments for age, years of training, alternative university programs and successive investment decision points.

The Research Data

The data used in the research were of two kinds: average cost data and average benefit data for the base year, 1968. The average costs, in turn, were subdivided into three classes: direct costs, indirect costs, and negative costs. The direct costs included: tuition fees, registration fees, student activities fees, and other academic costs for the education and engineering faculties. The average earnings foregone in the four selected trades constituted the indirect costs, while the financial assistance available in terms of bursaries, subsistence allowances, and payment of tuition fees, constituted the negative costs. In this case, the latter reduced the influence of the former.

The benefits data used in the study were obtained from three sources: an average salary scale for vocational education teachers, an average salary scale for academic teachers, and

an average salary scale for professional engineers. The first two were derived from collective agreements for the school year 1968-69, while the third was derived from a survey of the actual salaries paid to professional engineers in three Canadian provinces in 1968.

Methodology

Although the names may differ somewhat, the methods used for evaluating educational investments are to a large degree the same as those used for appraising physical capital expenditures. They include: marginal benefits analysis, net present value analysis (or discounted cash flows), internal rate of return analysis, and benefit/cost ratios (profitability index). Generally, though, the various methods come under the heading of cost-benefit analysis since they all make use of costs and benefits quantities in estimating the monetary returns to investment.

Three of the evaluation methods were used in this study: additional lifetime earnings (marginal benefits analysis), net present value, and internal rate of return. The minimum acceptable rate of return was set at 8 per cent. The monetary returns obtained by applying the three calculative methods to the costs and benefits data of the educational investment projects are presented in Tables XIII to XXVII, inclusive (see Chapter V).

Results

By using the monetary returns measures, it was possible to ascertain not only the extent to which the benefits exceeded the costs for each project, but also which projects had the best investment potential. What follows is a brief summary of the findings for each of the four trades categories.

Automotive mechanics. The monetary returns to the educational investment projects viewed from the standpoint of automotive mechanics between the ages of twenty-seven and thirty-seven indicated that in each case the benefits were greater than the costs incurred. The three year vocational education teacher training program was found to be the most desirable investment, while the three year academic teacher training program was the least desirable. Discounted at 8 per cent, the net present value at age twenty-seven was \$23,949 (single - with subsidy) for the former, and \$-6,836 for the latter. The monetary returns to the four year program in engineering training fell in the middle range, with a net present value of \$7,744 discounted at 8 per cent to age twenty-seven. It proved to be a somewhat better investment than academic teacher training, but not nearly as profitable as the Bachelor's degree in vocational education.

Construction electricians. Within the same age limits

as those for automotive mechanics, the monetary returns to the educational investments viewed by construction electricians were of a considerably reduced magnitude. In fact, at the upper age level, negative measures were obtained for both the three year academic teacher training option and the one year Route I Program 'without subsidy'. Using the internal rate of return criterion, the three year vocational education teacher training program proved to be the best investment possibility (16 per cent at age twenty-seven), followed by the four year engineering training option (7.5 per cent at age twenty-seven).

Senior stenographers. The monetary returns to educational investments by senior stenographers between the ages of twenty-eight and thirty-eight were the highest of all the returns for the four trades occupations studied. The internal rates of return ranged from infinity for the one year Route I Program 'with dependents' to 16 per cent for the three year academic teacher training option. Results were not obtained in this case for the engineering training option.

Beauticians. The results derived for beauticians between the ages of twenty-four and thirty-four indicated that the benefits surpassed the costs in all cases. As with the findings for the other three categories, the degree program in vocational education remained the best investment

as measured by the additional lifetime earnings and the net present values. Viewed at age twenty-four, the net present value of the degree program in vocational education discounted at 8 per cent came to \$40,725 (single - with subsidy).

II. CONCLUSIONS

Although one must be wary of over-stating any conclusions drawn from the findings of the study, it is still possible to infer a few relevant generalizations in relationship to the main problem and the sub-problems. In some instances, the limiting cases associated with the sub-problem variables are more pertinent than the generalizations themselves.

In Relation to the Main Problem

In general, it is evident that the monetary returns to investment in the Bachelor of Education in Vocational Education degree justify the costs incurred by tradesmen in pursuing further education via the Route I Program. Two factors combine to produce this result. First, there is the provision of a fairly high level of financial assistance for the first year of the program. Second, there are the various special clauses in the salary agreements which make accommodation for the past trades experience and, in a few cases, trades training of vocational education teachers.

If either of these factors were to be eliminated, it appears certain that the Bachelor's degree in vocational education would not be so financially attractive for many tradesmen.

In Relation to the Sub-Problems

Trades types. The four trades types selected for the study are representative of four earnings levels and two trades training levels. Senior stenographers and beauticians are at the lower levels of both earnings and training, while automotive mechanics and construction electricians are at the upper levels in both cases. The monetary returns findings suggest that, on an average, the more training one has as a tradesman, the less are the financial benefits which accrue to investment in vocational education teacher training. The exception to this conclusion would occur in the case of those few salary agreements which take trades training into account in determining salary placement.

Sex. The monetary returns findings substantiate the conclusion that females gain far more from investment in vocational education teacher training than do the males. In view of the universality of the single salary format in the teacher-board collective agreements throughout the province, it may not be going too far to observe that women move from a position of inequality to one of equality in

deciding to become vocational education teachers. Of course, the same would hold true for the academic teacher training program.

Age. As might be expected, the monetary returns to investment in vocational education teacher training decline in proportion to the advancing age of the potential investors. Nonetheless, the findings indicate that investment in the Bachelor's degree in vocational education is economically feasible up to the late thirties for males and probably somewhat beyond that point for females. Tradesmen from the upper earnings levels, as exemplified by construction electricians, would have to complete the Bachelor's degree before the investment would become worthwhile.

Years of training. Since vocational education teachers can achieve conditional certification after one year of teacher training (equivalent to two years of academic teacher training), the question of a one or two or three year program remains open to them. It has already been observed that the three year (degree) program is an economically sound choice in terms of the four trades types studied. However, the value of the investment declines considerably with the reduction of the number of years of training. Indeed, for construction electricians, the costs become prohibitive at the one year of training level and nearly so at the two year level. If the financial assistance were to be removed, there

would be no justification for investment in any level of the Route I Program by members of this trades occupation.

Alternative university programs. Two obvious conclusions follow from a comparison of the monetary returns to the alternative university programs with those to vocational education teacher training. The first is that the three year Route I Program is the best of the three investment alternatives considered for the two male categories. The second is that the three year Route I Program is the better of the two investment alternatives considered for the two female categories. In regard to the latter, it is interesting to note that the one year Route I Program 'without subsidy' is more attractive as an investment than the three year academic teacher training option.

Successive decisions. Assuming that the tradesmen are committed to a career in vocational education, they may decide to return to university to complete the second year and then the third year of the Route I Program. The monetary returns to these successive decisions, based on the internal structure of the average salary scale for vocational education teachers, suggest that investment in further education is worthwhile up to the late thirties for both sexes. All of the monetary returns for the third decision outrank those for the second decision. This results from the considerably higher salaries paid to teachers with four

years of training as compared to those with three years of training. Consequently, one must conclude that even without financial assistance, the vocational education teacher would be making a prudent investment judgment in deciding to return to university to complete the course requirements for the Bachelor of Education in Vocational Education degree.

III. POLICY IMPLICATIONS

The implications of this study fall into the broad areas of private decision making and policy decision making. The private behavioral possibilities which are apparently implied by the findings were outlined in Chapter V, in connection with the issue of applicability, and in the preceding section of this chapter.

As for the policy implications, the monetary returns findings in general support the kinds of adjustments which have been made in both the financial assistance programs (bursaries and subsistence allowances) and the salary clauses in collective agreements. The major exception to this conclusion arises from the findings for construction electricians. In this limiting case, it is doubtful that either the financial assistance or the salary levels are sufficiently high to attract and retain competent teaching personnel.

If such happens to be the case, then further changes could be made in the financial assistance and/or the salary

policies. One approach to the problem would be to consider the possibility of extending financial assistance to the second and third years of the Route I Program. Of course, implementation of this change would have the effect of increasing the benefits to those groups which need financial support the least.

Another approach, and probably the more reasonable, would be to give greater emphasis to the trades training variable in the special placement clauses of collective agreements, as is currently done in one or two places (see Appendix D). The main virtue of this solution to the problem is that it compensates those tradesmen who have spent more time, effort, and money in acquiring their technical training.

IV. FURTHER RESEARCH

While this study sought and found the answers to several problems associated with the private monetary aspects of vocational education teacher training in Alberta, there are other problems which arose during the course of the investigation that might be considered appropriate for further research. Two of the problems can be identified as extensions of the inquiry reported here, while the other two are only indirectly related to it.

Since this study did not focus on the social costs and benefits of vocational education teacher training, it may be

that this is an area which would bear significant research findings. In the same context, research could be undertaken with regard to the monetary returns to the alternative vocational education teacher training program, that is, the Route II Program.

In a more socio-psychological view, the teaching career patterns of Route I Program graduates could be investigated and the results compared to the predictions made in this study. Finally, it would be interesting to know the psychological effects which occur as a result of a 'late vocation' to teacher training, that is, the resumption of the student's role by adults.

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A P P E N D I X A

ROUTE I PROGRAM INFORMATION SHEETS

FACULTY OF EDUCATION
Records Office

THE UNIVERSITY OF ALBERTA
Edmonton, Canada

GENERAL INFORMATION ON THE ROUTE I PROGRAM IN
VOCATIONAL EDUCATION

INTRODUCTION

This program is designed for the experienced in the world of tradesmen who desire entry into the teaching profession.

ENTRANCE REQUIREMENTS

Applicants for admission to this Program must possess senior matriculation (as per the attached sheet); present an Alberta first-class journeyman's certificate (if applicable); and provide evidence of a number of years of satisfactory working experience at the journeyman's level (normally five or more years). If these conditions are met and approved by the Vocational Education Admissions Committee, then the applicant is granted one year of credit on a four-year Bachelor of Education in Vocational Education degree program.

TEACHER CERTIFICATION

After one Winter Session at the University, the student is granted a Conditional Certificate which qualifies him to teach in the vocational high schools in the Province. The degree program may then be completed by attendance at additional Winter Sessions, or through Summer Schools and the Evening Credit Programs. Certain courses for credit may be taken at other universities in the Province of Alberta.

BURSARIES

Bursary assistance is available from local school boards and the Canada Manpower Centre. The applicant is responsible for negotiating his own financial assistance.

Successful completion of the program assures credit toward Professional qualifications and salary entitlement.

TRADE AREAS

Some of the general trade areas are as follows:

Automotive Trades	Construction Trades
Beauty Culture	Electricity/Electronics
Business Education	Graphic Arts
Commercial Foods	Metal Trades
Computing & Account Recording	Etc.

MATRICULATION REQUIREMENTS - VOCATIONAL EDUCATION -
ROUTE I

- NOTE: 1. The following matriculation requirements relate only to the Route 1 Program in Vocational Education.
2. These requirements supersede all previous regulations.

Students from the high schools of Alberta seeking admission to the B. Ed. in Vocational Education degree program, Route 1, Faculty of Education, University of Alberta, in September 1969, must possess:

- (a) A High School Diploma;
- (b) "B" (50%) or higher standing in each course presented for admission;
- (c) Five Grade XII subjects, each carrying a minimum weight of five credits, according to the following pattern:
 - (i) English 30;
 - (ii)
 - (iii) - Three Grade XII departmental examination subjects;
 - (iv)
 - (v) An additional Grade XII departmental examination subject or a Grade XII five-credit non-departmental examination subject. The non-examination subject must not be in the same field as any of the departmental examination subjects, and it must not be related to the trade area.
- (d) An average of 60 % or higher on the four Grade XII examination subjects carrying the highest grades.

- Notes: 1. Students planning to enter a teacher education program in the Faculty of Education must present proof of their competence in spoken English.
2. Students planning to enter a teacher education program are advised to present those Grade XII subjects basic to the subject area in which they plan to specialize.
3. Adult applicants (age 20 or over) will not be required to present a high school diploma, but (b), (c) and (d) above still apply.

These general regulations notwithstanding, the University may, at its discretion, refuse admission to any applicant.

Please refer all queries to:

The Associate Dean (Student Programs & Records),
Attention: M.W. Brown, Assistant to Associate Dean,
Faculty of Education,
University of Alberta,
Edmonton, Alberta.

A P P E N D I X B

CANADA MANPOWER CORRESPONDENCE

CIRCULAR LETTER #59

April 24, 1968

To: School and Junior College Administrators
From: Director of Technical and Vocational Education

VOCATIONAL EDUCATION BURSARIES

A Copy of Order-in-Council 657/68 is attached. It provides details of the vocational education bursary support program which becomes effective for the 1968-69 university year.

There are some significant changes in the design of this program and the following are now drawn to your attention:

1. SPONSORS

A candidate for a bursary may be sponsored by a School Board, a Junior College Board, or the Department of Education. "Free Agent" type bursaries have been discontinued.

2. BURSARY SUPPORT

Previously, School Board support and Manpower support were interdependent. These have now been disassociated, so that it will be possible for a Board to support a candidate even though Manpower doesn't. Under this scheme, the School Board would normally grant the maximum support of \$3,000 for a candidate with dependents or \$1,800 for a person without dependents (with dependency as determined for income tax purposes).

The candidate would also apply to Canada Manpower who may be expected to provide training allowances and payment of university tuition fees for acceptable candidates. It is expected that all School Board sponsored candidates will be acceptable to Canada Manpower so that the total support provided to a candidate is substantially that which previously existed. However, because of Manpower's varying schedule of training allowances, some candidates will receive more support than was previously possible and a few may receive slightly lesser.

3. REIMBURSEMENT TO A BOARD

The Department of Education will provide, as a grant to a School Board or a Junior College Board, $66 \frac{2}{3} \%$ of the amount paid by the Board to a candidate, to a maximum amount by the Department of \$2,000 for a candidate with dependents or \$1,200 for a candidate without dependents (dependency as determined for income tax purposes).

A Board may, of course, sponsor a candidate for any amount which it wishes but the $66 \frac{2}{3} \%$ provincial amount would apply only up to the \$2,000 or the \$1,200 maximum noted.

4. CANADA MANPOWER ALLOWANCES

The candidate should be advised to apply to his nearest Canada Manpower Centre requesting support for his proposed training program. He should submit a completed copy of the "Ruling Concerning the Application" as supplied by the Dean of the Faculty concerned. This form must also be completed by the sponsoring Board. The candidate will be responsible to successfully negotiate his acceptance by Canada Manpower.

The following is the present schedule of Canada Manpower training allowances:

	At Home	Away from Home
Single	\$35.00 per week	\$50.00 per week
1 Dependent	54.00 per week	69.00 per week
2 Dependents	64.00 per week	79.00 per week
3 or more Dependents	73.00 per week	88.00 per week

In addition, Canada Manpower will pay the university tuition fees to the university concerned through its purpose of training arrangements.

5. PROGRAMS

The programs for which bursary support may be provided are (a) Vocational Teacher Education program as offered by the University of Alberta, and (b) the Vocational Counsellor Diploma programs as offered by the University of Alberta, and the University of Calgary.

6. APPLICATION PROCEDURES FOR A BURSARY CANDIDATE

- A. The applicant applies to the University for admittance to the Vocational Teacher Education Program (Route 1) or the Vocational Counsellor Diploma Program.
- B. If he is accepted, the University will issue him with a form entitled "Ruling Concerning the Application".
- C. This form is taken to the School Board or Junior College Board who is prepared to sponsor the candidate. The form makes provision for the School Board official's signature stating that the candidate is recommended for a bursary of whatever amount the School Board have agreed upon. (Normal maxima are \$3,000 and \$1,800.)
- D. The candidate applies to a Canada Manpower Centre for training allowances and submits a copy of the "Ruling Concerning the Application" which signifies that (a) he has received admittance, and (b) that he is being sponsored.

7. SCHOOL BOARD PROCEDURE FOR PROCESSING APPLICATIONS

- A. If the School Board agrees to sponsor a prospective teacher who has already received admission to the University, the School Board official signs the "Ruling Concerning the Application" and states the bursary amount which the Board will provide.
- B. Usually a School Board requires a candidate to sign an Undertaking to provide service for a specific number of years following the period of training.
- C. School Boards, in the past, have paid out the bursary on the basis of eight monthly installments.
- D. After the Board has paid out the bursary amount to the candidate it submits a claim to the Chief Administrative Officer, Department of Education, on form 1302-346 for reimbursement of 66 2/3 % of the cost of the bursary provided. The candidate's income tax form TD-1 should accompany the claim for reimbursement.

8. DEPARTMENT OF EDUCATION BURSARIES

- A. Candidates for bursary who are employed by the Department of Education submit proof of admission to the University and a letter of approval from the Minister of Education to

the Chairman of the Students Assistance Board.

- B. The applicant then applies to Canada Manpower Centre in the same manner as if he were being sponsored by a school board and presents the same documents (i.e. a signed copy of the "Ruling Concerning the Application").

"G.W. Carter"

Assistant Director of Technical Education
for Director of Technical and Vocational Education

CANADA MANPOWER CENTRE
DEPARTMENT OF MANPOWER AND IMMIGRATION
Centennial Building
10015 - 103 Avenue
Edmonton, Alberta

17 December 1969

Mr. Ken Wallace
11623 - 35 A Avenue
Edmonton, Alberta

Dear Mr. Wallace:

Following is the information concerning Vocational Teacher Training you requested by telephone 8 December 1969.

Persons who have a journeyman certificate and five years in a trade should first approach the University of Alberta for acceptance into the training program, after obtaining a certificate of acceptance they then approach a school board for a bursary. If granted a bursary the client then goes to the Canada Manpower Centre located on the University of Alberta campus and requests assistance under our Occupational Training for Adults program.

This assistance takes the form of payment of the cost of tuition for the year of training at the U of A; to qualify for such assistance a person must be at least one year past the school leaving age and have been out of the regular school system for one complete year. Needless to say under these criteria all clients qualify for Vocational Teacher training. Subsistence allowances which vary according to the trainees marital status are usually paid also. To qualify for this assistance trainees must have been attached to the labour force for the past three years, this means working or looking for work or ill in hospital, or have dependents who are substantially dependent upon him. Allowances range from \$40.00 weekly for a single person to \$79.00 for a person with three dependents. An extra \$23.00 a week is paid to any trainee who comes to a training centre and maintains his family at his usual residence and pays room and board in the city in which he attends school. Single men rarely qualify for the living-away-from-home allowance.

I hope this information will be of assistance to you.

Yours truly,

(Mrs.) M.W. Hunting
Program Co-Ordinator

CANADA MANPOWER CENTRE
DEPARTMENT OF MANPOWER AND IMMIGRATION
Centennial Building
10015 - 103 Avenue
Edmonton, Alberta

7 January, 1970

Mr. Ken Wallace
11623 - 35 A Avenue
Edmonton, Alberta

Dear Mr. Wallace:

With reference to your telephone call regarding salaries for Beauticians, the following are the salaries usually quoted to us:

Recent graduate from Hairdressing School
without experience -- \$60.00 per week.

Two to Three years experience -- \$65.00 per week.

Five years experience -- \$80 to \$85.00 per week.

Many Beauticians work on a salary plus commission basis. This encourages them to develop steady customers.

I trust this information will be helpful to you.

Yours very truly,

(Miss) M.I. Slack
Division Manager

CANADA MANPOWER CENTRE
 DEPARTMENT OF MANPOWER AND IMMIGRATION
 Centennial Building
 10015 - 103 Avenue
 Edmonton, Alberta

25 February 1970

Mr. K. Wallace
 11623 - 35 A Avenue
 Edmonton, Alberta

Dear Mr. Wallace:

In answer to your query about the subsistence allowance rates paid to trainees in 1968 and 1969 under the Occupational Training for Adults Program, following are the rates that were in effect in Alberta:

1 April 1967 - 30 June 1968

Single person	\$35.00 week
1 Dependent	\$54.00 week
2 Dependents	\$64.00 week
3 or more Dependents	\$73.00 week

If the trainee was living away from home during training and maintaining two (2) homes for that period an extra \$15.00 per week "living-away-from-home allowance" was payable.

1 July 1968 - 30 June 1969

Single person	\$37.00 week
1 Dependent	\$54.00 week
2 Dependents	\$64.00 week
3 or more Dependents	\$73.00 week

The living-away-from-home allowance was \$21.00 a week.

1 July 1969 - Present

Single person	\$40.00 week
1 Dependent	\$58.00 week
2 Dependents	\$69.00 week
3 or more Dependents	\$79.00 week

The living-away-from-home allowance is \$23.00 a week.

If you require any further information please contact me.

Yours truly,

(Mrs.) M.W. Hunting
 Program Co-Ordinator

A P P E N D I X C

REGULATIONS GOVERNING DESIGNATED TRADES

ALBERTA REGULATION 266/65

THE TRADESMEN'S QUALIFICATION ACT

DESIGNATION OF TRADES AND REGULATIONS GOVERNING
ENGAGING IN A DESIGNATED TRADE

(O.C. 891/65)

(Filed May 20, 1965)

The Lieutenant Governor in Council, upon the recommendation of the Honourable the Minister of Labour, pursuant to clauses (a) and (b) of section 2 of The Tradesmen's Qualification Act, is pleased to designate trades to which the Act applies and establish Regulations Governing Engaging in a Designated Trade as follows:

1. Any person shall be prohibited from engaging in any trade designated as a trade to which The Tradesmen's Qualification Act, being chapter 340 of the Revised Statutes of Alberta, 1955, applies in any part of the Province unless such person is for the time being the holder of a subsisting certificate of proficiency in respect of such designated trade issued pursuant to the said Act, or is an apprentice who has entered into a contract of apprenticeship under The Apprenticeship Act, being chapter 14 of the Revised Statutes of Alberta, 1955, in respect of such designated trade.

2. Notwithstanding section 1, where a particular type of work comes within the description of a designated trade (hereinafter referred to as the "first trade") and also comes within the description of either

(a) another designated trade, or

(b) a trade that is regulated under another Act,

(hereinafter referred to as the "second trade"), a person who is legally entitled to engage in the second trade is not required to hold a certificate of proficiency of the first trade in order to do the particular type of work that comes within the description of both trades.

3. The following are designated as trades to which The Tradesmen's Qualification Act applies:

(1) The trade of a construction electrician

(2) The trade of a plumber

(3) The trade of a steamfitter

- (4) The trade of a gasfitter
 - (5) The trade of a motor mechanic
 - (6) The trade of an auto body mechanic
 - (7) The trade of a sheet metal mechanic
 - (8) The trade of a radio technician
 - (9) The trade of a refrigeration mechanic
 - (10) The trade of a heavy duty mechanic
 - (11) The trade of a beautician
 - (12) The trade of a barber
4. Alberta Regulation No. 153/57 governing the trade of a motor vehicle mechanic
- Alberta Regulation No. 355/58 governing the trade of an internal combustion engine mechanic
- Alberta Regulation No. 354/58 governing the trade of an electrician
- Alberta Regulation No. 158/57, as amended by Alberta Regulation No. 224/60, governing the trade of a refrigerator mechanic
- Alberta Regulation No. 447/59 governing the trade of beauty culture

shall be deemed to govern respectively

The trade of a motor mechanic

The trade of a heavy duty mechanic

The trade of a construction electrician

The trade of a refrigeration mechanic

The trade of a beautician

as designated above.

5. Alberta Regulations 160/57 and 182/62 are hereby rescinded.

A P P E N D I X D

SPECIAL PLACEMENT CLAUSES

Edmonton P.S.D. #7 -- 1968-69:

5.5 Vocational Teachers

- 5.5.1 The basic salary for teachers who have five years of industrial, commercial or technical experience, who have industrial, commercial or technical training, and who are designated as vocational teachers, shall be determined by the years of teacher education as evaluated in accordance with Clause 9.1, and by years of teacher experience, to which may be added a placement allowance.
- 5.5.1.1 Provided, however, that the total salary so determined shall result in a figure on the salary grid as set out in Clause 4.2 of this agreement and shall not exceed the maximum provided in the respective category of teacher education.
- 5.5.2 Teachers who, during the 1969-1970 school year, receive a vocational trade specialist allowance under the provision of the 1968-1969 agreement shall continue to receive it subject to Clause 5.5.1.1.

Grande Prairie P.S.D. #2357 -- 1968-69:

Table II

3.1.2 Vocational Teachers Initial Placement

Initial placement will be based on trade training and trade experience:

An eligible vocational teacher will automatically sit at column 2 and 0 experience on Table 1. 0 level counts as the 1st year of vocational training.

One increment under column 2 will be granted for each year of training.

One-half an increment under column 2 will be granted for each year of experience in trade up to the maximum figure of step 8, column 2 on Table I except for:

Uneven year of experience such as 1, 3, 5, 7, which may be related to the nearest higher salary figure.

The Board will pay for the use of one certificate, the highest rated certificate the teacher possesses in the trade area related to the subject to be taught. The following maximum allowable years of training to obtain the trade certificate which will be recognized for placement on Table II will be as follows:

Auto	4	Welding 2nd	2
Machine Shop	4	Electricity	4
Pipe Trades	4	Drafting	3
Carpentry	4	Cook	3
Electronics	4	Beautician	1
Welding 1st	3	Merchandising	1

Vocational teachers on staff September 30, 1968 will continue to be placed on the grid according to the schedule in effect August 31, 1968.

The vocational teacher will advance beyond his initial placement column on Table I as he completes years of teacher training and presents a TQS evaluation for salary in the same manner as all other teachers.

County of Leduc # 25 -- 1968-69:

- 5.0 Vocational teacher salary entitlement provided he has had no previous teaching experience as a certified teacher will be the minimum salary rate according to his evaluation of university education for salary purposes.

In addition to this salary rate, each vocational education teacher will be entitled to an industrial experience allowance as set forth below, provided that in any case his total salary shall not exceed the maximum salary rate according to his evaluation.

<u>Industrial Experience</u>	<u>Increments</u>
10 years	5
8-9 years	4
6-7 years	3
4-5 years	2
2-3 years	1
0-1 years	0

- 5.1 The initial industrial experience allowance shall remain constant throughout the period of employment.
- 5.2 The original placement of the vocational teacher on the salary table shall be subject to review by the Interpretation Committee at the request of the County of Leduc Local of The Alberta Teachers' Association (ATA).

Westlock School Division #37 -- 1968-69:

- 8.3 A teacher with a journeyman's certificate shall be granted one year teacher education in addition to his/her university training. Also each year of experience beyond journeyman's certification shall be considered as a year of teaching experience, to a maximum of six years.

A P P E N D I X E

REGULATIONS GOVERNING THE CONDITIONAL CERTIFICATE

CONDITIONAL CERTIFICATE

4. (a) Students admitted to the second year of the B. Ed. degree program in Alberta after September 1, 1968 on the basis of a journeyman's certificate or equivalent or on the basis of an approved certificate or diploma from an acceptable school of fine arts, such as music, may be issued a Conditional Certificate upon successful completion of the second year of the B. Ed. degree program.

(b) If the holder of a Conditional Certificate does not qualify for a Provisional Certificate within the three-year period of the validity of the initial certificate, the Conditional Certificate may be extended year by year to a maximum of three additional years provided that:

- (i) The teacher furnishes evidence of having completed further work towards the next level of certification for each extension requested.
- (ii) An officer acceptable to the Chief Superintendent of Schools recommends the extension on the basis of satisfactory teaching experience.

(c) The holder of a Conditional Certificate who completes the third year of the B. Ed. degree may be issued a Provisional Certificate valid for three years and subject to extension as under section 3 (b) provided that not more than 9 years elapse between the issuing of the Conditional Certificate and the completion of the B. Ed. degree.

A P P E N D I X F

PROGRAMS -- 1969-70

HARRY AINLAY COMPOSITE HIGH SCHOOL

EDMONTON

HARRY AINLAY COMPOSITE HIGH SCHOOL

This booklet will give you information about the very large number of courses and the wide variety of programs that are offered at Harry Ainlay.

There are some basic required courses at each grade level for all programs leading to a High School Diploma and there are a few more requirements for the matriculation programs. In addition most courses except English and Social Studies, have a minimum requirement of a "B" standing before you may proceed to the next higher course, but apart from these limitations you have complete freedom of choice.

A High School Diploma requires 100 high school credits including:

15 credits in English, including 5 in English 10 or 13 and 5 in English 30 or 33 or 36;

10 credits in Social Studies including 5 in Social Studies 10 and 5 other credits in Social Studies 20 or Geography 20 or Psychology 20 or Sociology 20 or Economics 30;

At least 2 credits in Physical Education 10;

5 credits in Mathematics

5 credits in Science

Credit in TWO Grade XII subjects in addition to English 30 or 33 or 36. A "32" Vocational course is the equivalent of two Grade XII courses for diploma purposes.

Matriculation requires a high school diploma and at least 4 "30" level departmental examination courses, including English 30, with a minimum mark of 50 % in each subject and an overall average of 60 %. In certain University Faculties Art 30, Drama 30 or Music 30 or 31 may be counted as one of the 5 Grade XII courses. To provide for greater flexibility in the choice of Faculties and Universities it is wise for matriculation students to plan a program having 6 "30" level Grade XII courses. For details of the requirements for each Faculty please check the table on page 16 of this booklet.

NOTE: The Prerequisite for English 30 is English 10 or 13 plus 10 other credits in English usually from Grade XI English.

The Prerequisite for Social Studies 30 is Social Studies 10 and Social Studies 20.

In this outline we will set the basic requirements at each grade level and then show options or electives available in each of the major program areas i.e., Business, Technical, General, Matriculation.

The programs in this booklet are based on a three year High School program. However students who wish to add another year to their programs, to take advantage of the many opportunities in this school, may do so at the end of Grade X. These students are advised to see their school counsellor or grade co-ordinator to work out a balanced program for their second, third and fourth years in High School.

Students on the South Side, except those residing north of 98 Avenue, who desire a Technical or Vocational program must attend Harry Ainlay Composite High School. The following programs are offered for these students in this school:

- Automotives 12, 22, 32
- Beauty Culture 12, 22, 32
- Building Construction 12, 22
- Commercial Art 12, 22, 32
- Drafting 12, 22, 32
- Electricity 12, 22, 32
- Electronics 12, 22, 32
- Food Preparation 12, 22, 32
- Industrial Chemistry 12, 22, 32
- Sheet Metal 12, 22

A P P E N D I X G

SUMMARY OF COSTS DATA

Prob- lem	Cate- gory	Description	Costs		Negative Costs		
			Foregone Earnings	Direct Costs	Tuition	Bursary	Subsistence Allowance
1.01	A.M. ³	1 yr., V.E.T.T., Single, F.A. ¹	\$6288.00	\$191.00	\$400.00	\$1800.00	\$1147.00 (37.00x31 wks)
1.02	A.M.	2 yrs, V.E.T.T. Single, F.A.	6288.00	191.00	--	--	--
1.03	A.M.	3 yrs, V.E.T.T., Single, F.A.	6288.00	191.00	400.00	1800.00	1147.00
			6288.00	591.00	--	--	--
			6288.00	591.00	--	--	--
1.04	A.M.	1 yr., V.E.T.T., F.A., 3 Deps.	6288.00	191.00	400.00	3000.00	2263.00 (73 x 31 wks)
1.05	A.M.	2 yrs, V.E.T.T., 3 Deps., F.A.	6288.00	191.00	400.00	3000.00	2263.00
			6288.00	591.00	--	--	--
1.06	A.M.	3 yrs, V.E.T.T., 3 Deps., F.A.	6288.00	191.00	400.00	3000.00	2263.00
			6288.00	591.00	--	--	--
1.07	A.M.	4 yrs, Engineering	6288.00	705.00	--	--	--
			6288.00	705.00	--	--	--
			6288.00	705.00	--	--	--
			6288.00	705.00	--	--	--
1.08	A.M.	3 yrs, Academic Teacher	6288.00	591.00	--	--	--
			6288.00	591.00	--	--	--
			6288.00	591.00	--	--	--
1.09	A.M.	1 yr., V.E.T.T., No. F.A.	6288.00	591.00	--	--	--
1.10	A.M.	1 yr - 1st Yr. to 2nd Yr.	6278.00	591.00	--	--	--

Prob- lem	Cate- gory	Description	Costs		Negative Costs		
			Foregone Earnings	Direct Costs	Tuition	Bursary	Subsistence Allowance
1.11	A.M.	1 yr - 2nd Yr. to 3rd Yr.	\$7036.00	\$591.00	\$ --	--	\$ --
2.01	C.E. ⁴	1 yr. V.E.T.T., F.A. Single	7092.00	191.00	400.00	1800.00	1147.00 (37.00x31 wks)
2.02	C.E.	2 yrs, V.E.T.T., Single, F.A.	7092.00	191.00	400.00	1800.00	1147.00
2.03	C.E.	3 yrs, V.E.T.T., Single, F.A.	7092.00	191.00	400.00	1800.00	1147.00
2.04	C.E.	1 yr. V.E.T.T., F.A., 3 Deps.	7092.00	191.00	400.00	3000.00	2263.00
2.05	C.E.	2 yrs. V.E.T.T., F.A., 3 Deps.	7092.00	191.00	400.00	3000.00	2263.00
2.06	C.E.	3 yrs. V.E.T.T., F.A., 3 Deps.	7092.00	191.00	400.00	3000.00	2263.00
2.07	C.E.	4 yrs. Engineering	7092.00	705.00	--	--	--
2.08	C.E.	3 yrs. Academic Teacher	7092.00	591.00	--	--	--
2.09	C.E.	1 yr. V.E.T.T. No F.A.	7092.00	591.00	--	--	--
2.10	C.E.	1 yr. V.E.T.T., 1st yr. to 2nd yr.	6278.00	591.00	--	--	--

Prob- lem	Cate- gory	Description	Costs		Negative Costs			
			Foregone Earnings	Direct Costs	Tuition	Bursary	Subsistence Allowance	
2.11	C.E.	1 yr. V.E.T.T., 2nd yr. to 3rd yr.	\$7036.00	\$591.00	\$ --	--	\$ --	--
3.01	Sr.S. ⁵	1 yr. V.E.T.T., F.A., Single	4164.00	191.00	400.00	1800.00	1147.00	
3.02	Sr.S.	2 yrs. V.E.T.T., F.A., Single	4164.00	191.00	400.00	1800.00	1147.00	
3.03	Sr.S.	3 yrs. V.E.T.T., F.A., Single	4164.00	191.00	400.00	1800.00	1147.00	
3.04	Sr.S.	1 yr. V.E.T.T., F.A., 3 Deps.	4164.00	191.00	400.00	3000.00	2263.00	
3.05	Sr.S.	2 yrs. V.E.T.T., F.A., 3 Deps.	4164.00	191.00	400.00	3000.00	2263.00	
3.06	Sr.S.	3 yrs. V.E.T.T., 3 Deps, F.A.	4164.00	191.00	400.00	3000.00	2263.00	
3.07	Sr.S.	3 yrs. Academic Teacher	4164.00	591.00	--	--	--	
3.08	Sr.S.	1 yr. V.E.T.T., No. F.A.	4164.00	591.00	--	--	--	
3.09	Sr.S.	2nd Decision 1st yr. to 2nd yr.	6497.00	591.00	--	--	--	
3.10	Sr.S.	3rd Decision 2nd yr. to 3rd yr.	7337.00	591.00	--	--	--	

Prob- lem	Cate- gory	Description	Costs		Negative Costs		
			Foregone Earnings	Direct Costs	Tuition	Bursary	Subsistence Allowance
4.01	Btn. ⁶	1 yr. V.E.T.T. F.A., Single	\$4940.00	\$191.00	\$400.00	\$1800.00	\$1147.00
4.02	Btn.	2 yrs. V.E.T.T. F.A., Single	4940.00	191.00	400.00	1800.00	1147.00
			4940.00	591.00	--	--	--
4.03	Btn.	3 yrs. V.E.T.T. F.A., Single	4940.00	191.00	400.00	1800.00	1147.00
			4940.00	591.00	--	--	--
			4940.00	591.00	--	--	--
4.04	Btn.	1 yr. V.E.T.T. Sub. 3 Deps.	4940.00	191.00	400.00	3000.00	2263.00
4.05	Btn.	2 yrs. V.E.T.T. F.A., 3 Deps.	4940.00	191.00	400.00	3000.00	2263.00
			4940.00	591.00	--	--	--
4.06	Btn.	3 yrs. V.E.T.T. F.A., 3 Deps.	4940.00	191.00	400.00	3000.00	2263.00
			4940.00	591.00	--	--	--
			4940.00	591.00	--	--	--
4.07	Btn.	3 yrs. Academic Teacher	4940.00	591.00	--	--	--
			4940.00	591.00	--	--	--
			4940.00	591.00	--	--	--
4.08	Btn.	1 yr. V.E.T.T. No F.A.	4940.00	591.00	--	--	--
4.09	Btn.	2nd Decision 1st yr. to 2nd yr.	6278.00	591.00	--	--	--
4.10	Btn.	3rd Decision 2nd yr. to 3rd yr.	7036.00	591.00	--	--	--
1 --	V.E.T.T.	-- Vocational education teacher training					
2 --	F.A.	-- Financial assistance					
3 --	A.M.	-- Automotive mechanics					
4 --	C.E.	-- Construction electricians					
5 --	Sr.S.	-- Senior Stenographers					
6 --	Btn.	-- Beauticians					

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